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A PROXIMATE PRINCIPLE FROM PHYTOLACCA DECANDRA.

BY HENRY TRIMBLE.

Contribution from the Chemical Laboratory of the Philadelphia College of Pharmacy.
No. 123.

Read at the Pharmaceutical Meeting, Philadelphia College of Pharmacy, May 16.

Some weeks ago Mr. E. G. Eberhardt, chemist for Eli Lilly & Co., of Indianapolis, sent for further investigation a sample of material obtained from poke root. It was prepared according to the following method: The concentrated alcoholic percolate was precipitated by water, and the separated precipitate purified by solution in alcohol and precipitation by chloroform; this precipitate was dissolved in potassium hydrate solution and precipitated by diluted sulphuric acid, then dissolved in alcohol and precipitated by ether. The dried and finished product was obtained as an amorphous, grayish powder, glistening somewhat from its scaly condition. When shaken with water it frothed considerably. Its taste was slightly bitter and acrid, and when inhaled it acted as a sternutatory. It was slightly soluble in cold and boiling water, soluble in alcohol; insoluble in ether and chloroform. Acetic acid dissolved it with the aid of heat, and formed a jelly on cooling. Alkalies formed with it soluble, amorphous compounds that scaled on drying. Sulphuric acid, when concentrated, dissolved it with a cherry-red color, changing to violet and purple. On the application of heat, the substance commenced to decompose at about 208° without fusing, and at a higher temperature was consumed without leaving an appreciable residue.

Nearly as much loss in moisture occurred when the substance was dried in a vacuum over sulphuric acid at ordinary temperatures, as when it was heated in an air bath at 110° . No further loss was noted on raising the temperature from 110° to 120° .

The substance, when dried at these temperatures, gave the following results on combustion :

- (I) 0·2563 gram of substance gave 0·5543 gram CO_2 , and 0·1750 gram H_2O .
 (II) 0·203 gram of substance gave 0·442 gram CO_2 , and 0·1429 gram H_2O .

	(I)	(II)
	Per Cent.	Per Cent.
Carbon,	58·98	59·36
Hydrogen,	7·58	7·81
Oxygen,	33·44	32·83
	<hr/> 100·00	<hr/> 100·00

This corresponds to the formula $\text{C}_{54}\text{H}_{82}\text{O}_{23}$.

In the letter accompanying the sample, Mr. Eberhardt expressed the opinion that this substance resembled the phytolaccic acid of Terreil, mentioned in the AMERICAN JOURNAL OF PHARMACY, 1881, p. 325. There are, however, some important differences in solubility. It would probably be much nearer the truth to classify this compound with the saponins, since it resembles the latter in many of its properties.

In 1888 (AMERICAN JOURNAL OF PHARMACY, p. 123) Mr. W. A. Partee separated from poke root an amorphous substance which gave a reddish color with sulphuric acid, and which he considered to be saponin.

It may be said that the above analysis does not indicate saponin, but in answer to such an objection we may recall the fact that the difference from the published analyses is not great, that there are probably many saponins, and that it is doubtful if any one of the saponins has ever been prepared perfectly pure.

EPIPHEGUS VIRGINIANA.

BY ALBERT C. KOEPPEN, PH.G.

Contribution from the Chemical Laboratory of the Philadelphia College of Pharmacy.
No. 124.

This indigenous plant, commonly called "beech drop," is parasitic on the roots of the beech tree. Its medical properties are regarded as astringent and depurative.

A quantity of the drug was collected in August, in the vicinity of Philadelphia, and a portion was submitted to chemical examination, as follows:

A weighed quantity dried at 110° was found to contain 7.08 per cent. of moisture. This on ignition yielded 16.91 per cent. of ash. Preliminary tests for starch and tannin were made in a decoction of the drug, a blue color with iodine was obtained, indicating starch, and a dark green color with ferric chloride and a precipitate with gelatin indicating tannin.

Fifty grams of the drug in fine powder, yielded to petroleum ether 0.48 per cent. of a solid orange-yellow substance, which by recrystallization from hot absolute alcohol several times, was obtained in nearly white crystals. A larger quantity was prepared from another portion of the drug, and it was found to be a crystalline fat, melting at a low temperature and saponifying with solution of potassium hydrate.

After treatment with petroleum ether, the remaining drug was extracted with stronger ether, which solvent extracted 0.31 per cent. of a resinous substance. Gallic acid was not detected in this portion, and it was found to consist chiefly of resin.

Absolute alcohol was next applied to the residual drug, and extracted 9.32 per cent. This extract was soluble in water, and when so dissolved and acidified, petroleum ether extracted a crystalline body which did not reduce Fehling's solution, but did redden litmus paper, and otherwise gave evidence of being an organic acid. From this same acidified solution, after removal of the organic acid, ether and chloroform extracted a body which gave all the reactions of a glucoside. After removal of these substances, the solution was made alkaline, and agitated with petroleum ether, ether and chloroform, the last, only, extracted a body, which, when purified, gave many of the alkaloidal reactions. An attempt to obtain larger quantities of these substances from the commercial drug failed, owing to the fact that the drug, as obtained in the market, had deteriorated; and instead of absolute alcohol extracting a substance soluble in water, this extract was found to be resinous, and did not indicate any glucoside or alkaloid, and but small quantities of organic acid. It was afterwards found that this commercial drug was more than a year old.

The analysis was continued on the fifty grams of fresh drug, and the following is a summary of the results obtained:

	Per Cent.
Fat,	0·48
Resin,	0·31
Alcohol extract, containing tannin, crystalline organic acid, alkaloid and glucoside,	9·32
Mucilage and sugars,	1·90
Sodium hydrate extract,	0·25
Hydrochloric acid extract,	0·14
Lignin,	0·28
Ash,	16·91
Moisture,	7·08
Cellulose and undetermined,	63·33
	<hr/> 100·00

A COMPARISON OF SOME MEDICINAL BRANDS OF HYDROGEN PEROXIDE.

BY R. LOUIS LLOYD, A.B.

Read at the Pharmaceutical Meeting of the Philadelphia College of Pharmacy, May 16.

The brands examined were Béné, Peuchot, Marchand and Oakland Chemical Company. Each was claimed to be chemically pure and of fifteen volumes strength. All were obtained directly from the manufacturers, and, though some were several weeks old, they were in unbroken packages and remained sealed until the moment of the estimation of oxygen. Mr. Peuchot learned that the analysis was being made and sent a special sample which he claimed would be an improvement on his former productions. This, in the table, is designated as Peuchot No. 2.

The *volume of oxygen* was estimated by the method of F. X. Moerk. A solution of potassium permanganate, 2·625 grams to the litre of water was prepared. About two litres of water was acidified with 5 cubic centimetres of dilute sulphuric acid, and exactly 5 cubic centimetres of the hydrogen peroxide solution added. The potassium permanganate solution was then poured in gradually until it ceased to be decolorized, and the number of cubic centimetres added, divided by 10, represents the volume of oxygen.

In the results for volume, that sample which was examined again after being opened, is marked with the small letter (*a*).

The *acidity* was reckoned by using a solution of ten milligrams of potassium hydrate in one cubic centimetre of water, with phenol-

phthalein as indicator. Ten cubic centimetres of the sample was tested in each case, the figures in the table representing the average of results.

Fifty cubic centimetres were evaporated at a low heat to dryness and both residue and the original sample tested for chloride, sulphate, phosphate, fluoride, borate, barium and other metals by the usual processes of the laboratory. Sodium and potassium were recognized by the Bunsen flame.

Each sample underwent the same treatment, and attention may be called to the fact that, however widely these results differ from results of other investigators, they are, as they claim to be, *comparisons*. The same weights, measures and solutions were used in every instance, in order to guarantee uniformity.

Generally more than one bottle of a brand was examined and the volume of oxygen was found to vary considerably, no doubt dependent largely on age. Of the Peuchot brand, it is claimed, however, it "can be left open and exposed to the air without losing strength."

	Specific Gravity.	Volume of Oxygen.	Volume of Oxygen after having been opened at least 24 hours.	Acidity, Milligrams of KOH for 10 cc.	Residue in 50 cc. Milligrams.	Sulphuric acid or Sulphate.	Metal.	Other matter.
O. C.,	1·0119	113·5—12·0	113·0	6·45	30·0	trace	Sodium	present
Marchand, . . .	1·0116	13·5—10·4	10·3—10·0	25·16	50·6	present	Sodium	boric acid
Béné,	1·0110	10·5—9·8	9·45	6·83	60·0	present	Sodium Potassium	none
Peuchot No. 2,	1·0120	11·76	—	7·20	150·0	trace	Calcium Sodium Potassium (trace)	glycerine
Peuchot No. 1,	1·0136	12·5—16·1	14·05	9·85	320·0	present	Sodium	present

All the samples contained HCl or chloride, and phosphoric acid or phosphate (Béné merely a trace); but were free from barium, except P. No. 1, which contained a trace.

In the residue from Marchand's solution no chloride could be found; the solution, however, evidently contained hydrochloric acid, which must have been driven off during evaporation, the excess of sulphuric acid preventing the formation of chlorides.

The residues from Peuchot's and O. C.'s solutions were not again entirely soluble in water, alcohol, ammonia or cold hydrochloric acid. In Peuchot No. 2 this insoluble matter was calcium phosphate.

ABSTRACTS FROM THE FRENCH JOURNALS.

TRANSLATED FOR THE AMERICAN JOURNAL OF PHARMACY.

The active principles of bryonia root.—M. Masson gives, in *Jour. de Pharm. et de Chim.*, March, 1893, p. 300, the following processes for the extraction and the purification of the active principles of bryonia root :

The fresh root is cleaned, cut and dried, then coarsely pulverized, and exhausted in the cold with water containing 3 per cent. of hydrochloric acid. The aqueous acid liquid is treated with tannin until no further precipitate forms. The precipitate, which is in the form of compact mass, is treated with water containing HCl, then with distilled water, dried, pulverized and dissolved in 90 per cent. alcohol; the solution is filtered, decomposed by oxide of zinc, and the resulting mass exhausted with cold distilled water; this upon evaporation yields impure *bryonin*, which is purified by dissolving it in cold distilled water, containing five per cent. HCl; and dialyzing until the liquid in the inner vessel yields a residue free from ash, but completely soluble in absolute alcohol. This alcoholic solution is mixed with anhydrous ether; the precipitate washed with ether and dried at 100°. Pure *bryonin* is white, amorphous, very bitter, soluble in water and alcohol, and insoluble in anhydrous ether and in chloroform. It is dextrogyre, precipitates tannin and ammoniacal plumbic acetate, and has the composition $C_{34}H_{48}O_9$; its alkali compounds are completely insoluble in alcohol.

The root exhausted with water as above, dried, and treated with 90 per cent. alcohol yields an impure resin which the author calls *bryoresin*. It is purified by triturating with acidulated water, agitating with several portions of boiling water, drying, dissolving in anhydrous ether and evaporating. The resin is soft at 15°, red, amorphous, soluble in alcohol, ether, chloroform, glacial acetic acid, and in alkalies, and from the latter solution is reprecipitated by acids.

Bryonin boiled with dilute sulphuric acid yields a *glucose*, which the author did not succeed in crystallizing, and a yellowish amorphous residue.

phous resin (called *bryogenin*), soluble in alcohol, insoluble in ether.

Inulin, since its discovery by V. Rose, in 1804, has always been prepared by precipitating it either in the cold or by means of alcohol, from its more or less clear aqueous solution. It is then subjected to reprecipitation until the product obtained is white. But this product, according to C. Tanret (*Jour. de Pharm. et de Chim.*, April, 1893, p. 354) is far from being pure; it has a rotatory power which varies from $\alpha_D = -31^\circ$ to $\alpha_D = -35^\circ$. The author has succeeded in separating two closely resembling, but nevertheless distinct principles, which he named respectively *pseudo-inulin* and *inulenin*.

The different solubilities of these bodies in presence of baryta water in excess, affords a means of separating them from inulin and also from one another.

For preparing inulin from Jerusalem artichoke, the tubers are scraped, the pulp expressed, and the juice cleared by means of solution of subacetate of lead; excess of lead is eliminated by adding sulphuric acid, and inulin is precipitated by addition of concentrated baryta water. A second precipitate can be obtained by adding alcohol of 80 per cent.; this is principally pseudo-inulin and inulenin. The precipitates are washed in cold baryta water, dissolved in hot water and reprecipitated. By repeating this treatment until the mother-liquor is no longer darkened by it, inulate of baryta is obtained. This is dissolved in hot water, and decomposed by means of CO_2 , the solution is boiled, filtered, and deposits, upon addition of $\frac{1}{4}$ of its volume of 95 per cent. alcohol, pure inulin. It is thrown on a filter, washed with 60 per cent. alcohol and dried over sulphuric acid. Pseudo-inulin is deposited from its aqueous solutions in irregular granules and from its alcoholic solutions in globules; it is very soluble in water and weak alcohol, while hot, but only slightly soluble in cold water, and insoluble in cold alcohol. It has a rotatory power of $\alpha_D = -32.2^\circ$, which under the influence of acids, is increased to -85.6° . Analysis indicates the formula 16 ($\text{C}_6\text{H}_{10}\text{O}_5$) H_2O .

To inulenin the author assigns the formula 10 ($\text{C}_6\text{H}_{10}\text{O}_5$) 2 H_2O . It may be procured in fine microscopic needles; dried at 100°C , it is soluble in several parts of cold water, in 35 parts of cold 30 per cent. alcohol, and in 245 parts of 50 per cent. alcohol.

Phosphoric acid in wines has been estimated by Morgenstern and Paolinoff (*Jour. Pharm. et Chim.*, May, 1893, p. 482) by the molybdate and the citrate methods, and they find that the latter gives the best results. They apply their simplified method directly to the wine, without first submitting it to evaporation, and without calcining the dry residue, thereby avoiding considerable loss of time. 200 cc. of wine are placed in a conical glass, boiled for some time to remove alcohol, 20 cc. of nitric acid, sp. gr. 1·38, added, and the boiling continued to eliminate the greater part of the nitrogen oxides. After cooling, ammonia is added to neutral reaction, and to the cooled liquid 50 cc. ammonium citrate are added. Then add drop by drop, and stirring constantly, 50 cc. magnesium mixture, when ammonio-magnesium phosphate will at once deposit. The pyro salt obtained after calcination is entirely white.

Tar water.—Ernest Gille states that the *concentrated tar solution* of the Belgian pharmacopœia (Norwegian tar, 250; sodium bicarbonate, 15; water, 1,000; heat in a water-bath for 3 hours and condense volatile products) has the specific gravity of 1·0127, leaves, upon the evaporation and drying of the residue, 3·7052 per cent. of extract, and yields 0·8932 per cent. ash. The tar water (made from conc. tar solution 30, and distilled water 970) differs but little from pure water in density, has but a slight tint, keeps unaltered for a long time and yields 0·0918 per cent. of extract and 0·0253 per cent. of ash. The tar water of the German pharmacopœia is considerably darker, becomes rapidly cloudy, has the specific weight 1·0027, and yields 0·4966 per cent. extract and 0·0308 per cent. ash. Jeannel's formula, triturating intimately 10 gm. tar with 10 gm. sodium carbonate and diluting to obtain 1 kgm., gives a tar water whose specific weight is 1·0042, and which yields 1·2085 per cent. extract and 0·3640 per cent. ash.

Tar water prepared according to the Belgian pharmacopœia, if subjected to distillation in a current of steam, yields a liquid which slightly reddens litmus, turns brown by action of alkalies, shows strong reducing power, is colored violet by ferric chloride, and yields iodoform with iodine and potassium. It gives the reactions of furfural with aniline and hydrochloric acid. The concentrated liquor of the Belgian Pharmacopœia shows the same characters under the same condition, but, of course, in greater degree. That of the German pharmacopœia, upon distillation, yields a liquid

which precipitates abundantly upon addition of an excess of bromine water.—*Jour. de Pharm. d'Anvers*, March, 1893, p. 81.

The methylamines have been examined chemically and physiologically by Dr. Combemale (*Bull. gén. de thérap.*, March, 1893, p. 241). Monomethylamine is a compound in which one hydrogen atom of the ammoniacal radical is replaced by one methyl radical, its formula being $(\text{CH}_3)\text{NH}_2$. It is a gas, which several degrees below zero is converted into a very mobile liquid; it has an ammoniacal odor, is strongly alkaline, ignites, when it comes in contact with a flame, and burns with a yellowish color, giving water, carbonic acid and nitrogen. It is the most soluble of all known gases, one volume of water dissolving 1,150 volumes at 12° . After citing a large number of physiological experiments in detail, the author arrives at the conclusion that when injected under the skin, monomethylamine produces local irritation, even to necrosis, while its action on the entire organism causes haemorrhage of the liver, lungs, heart and intestines. This general action is manifested by change in temperature, continuous flow of saliva and albuminuria. The local effects are produced by a solution of 1 in 250. For the general effects the dose must not exceed 10 cgm. per kgm. of body weight; above 15 cgm. death is certain.

Dimethylamine, $(\text{CH}_3)_2\text{NH}$, has much the same properties as monomethylamine. It is obtained pure and without difficulty by boiling nitrosodimethylamine with sodium oxide. Ingested into the stomach and employed in various doses, dimethylamine showed no appreciable action. Injected hypodermically it acts as an energetic caustic, producing an eschar with a solution of 1 in 200. Twenty cgm. per kgm. of body weight is the minimum toxic dose. The change of temperature produced is not constant, nor is it proportionate to the dose or the strength of the solution employed. It produces increased salivation and also increases the alkalinity of the saliva. It is eliminated in part by the kidneys.

Glycerite of oil of cade.—Ch. E. Quinquaud (*L' Union phar.*, 1893, p. 190) commences the treatment of psoriasis by applying the following plaster to the diseased surfaces: Lead plaster, 600 gm.; yellow wax, 300 gm.; poppy seed oil, 600 gm. The scales should be removed, and a lukewarm alkaline bath given for half an hour, using not more than 100 gm. of carbonate of sodium for the bath. Upon leaving the bath the diseased parts should be anointed with

the following glycerite: Oil of cade, 140 gm., emulsionized with 15 gm. fluid extract of quillaia; and glycerite of starch, 845 gm. If this is well tolerated by the skin, it can be strengthened according to the following formula: Oil of cade, 460 gm.; fluid extract of quillaia, 40 gm.; glycerite of starch, 500 gm. If untoward symptoms arise, accidents can be averted by administering 2 to 6 gm. of salol during 24 hours.

Calcium bisulphite is, according to the clinical observations of Nils Sjoberg (*Eina*, through *Rev. intern. de bibliog. méd.*, April, 1893, p. 137), such a reliable antiseptic, that the irritation caused by it is an insignificant objection. However, it cannot be used in surgical operations, because it attacks the instruments used, but it can always find appropriate application as an antiseptic in virulent wounds, ulcers, etc. (See also Amer. Journ. of Pharm., 1892, p. 467.)

Syrup of narceine.—M. Patrouillard proposes the following formula for an efficacious preparation: Narceine, 0.25 gm.; sodium benzoate, 0.40 gm., and simple syrup, 300 gm. The two powders should be triturated in a mortar, so that the solution may be perfect.—*Four. de Pharm. et de Chim.*, April, 1893, p. 397.

GLEANINGS FROM THE GERMAN JOURNALS.

BY FRANK X. MOERK, PH.G.

Potassium ferrocyanide, generally considered to be a fairly stable compound, has been found in a recent investigation to be decomposable, not only by the weakest acids, but also by numerous non-acid organic substances, hydrocyanic acid being liberated. The dilute mineral acids containing even less than 0.1 per cent. formic, acetic, butyric, lactic, tartaric, benzoic, etc., acids, even carbonic acid and hydrogen sulphide, phenols, peptones, casein, etc., will decompose potassium ferrocyanide more or less quickly at temperatures below 100° C., liberating a portion of the hydrocyanic acid and forming white insoluble potassium ferrous ferrocyanide $K_2Fe(Fe(CN)_6)$; with carbonic acid the reaction is $2K_4Fe(CN)_6 + 3CO_2 + 3H_2O = 6HCN + K_2Fe(Fe(CN)_6) + 3K_2CO_3$. In the manufacture of hydrocyanic acid from the ferrocyanide and sulphuric acid the residue consists of the above salt, from which the sulphuric acid extracts a part of the iron as ferrous sulphate which by oxidation changes to

ferric salt, and this then reacts with the ferrocyanide, forming Prussian blue, thus explaining the blue color of the residue. The acids in the gastric juice (hydrochloric and lactic) decomposing potassium ferrocyanide, direct experiments were made with artificial gastric juice at a temperature of 37–40° C., with the result that after a short time, evidence was obtained showing the formation of hydrocyanic acid. Casein and peptone, in the absence of free acids, under the same conditions, liberated but traces of hydrocyanic acid. The non-poisonous action of potassium ferrocyanide is explained by the decomposition being very slow, but if the administration be followed by that of an acid (a case is cited in which tartaric acid was taken afterward), death is rapidly caused. The decomposition of potassium ferrocyanide by dilute acetic acid has some importance in the examination of urine for albumen by the ferrocyanide test, a turbidity, occurring only after some standing, may not be due to the presence of albumen, but to the formation of insoluble potassium ferrous ferrocyanide. *The detection of hydrocyanic acid or simple cyanides*, excepting mercuric cyanide, in presence of potassium ferrocyanide is alone possible by Jaquemin's method, in which the material is distilled after the addition of a considerable quantity of sodium bicarbonate. This salt will not unite with free hydrocyanic acid, nor will it decompose potassium ferrocyanide. The distillate from 0.01 gram potassium cyanide, 10 grams ferrocyanide and 200 cc. water, will give a pronounced test for hydrocyanic acid.

Mercuric cyanide will not yield HCN by Jaquemin's test, but if to the mixture a few cc. of hydrogen sulphide water be added the distillate will contain HCN; this test is serviceable for the detection of mercuric cyanide even in presence of large quantities of ferrocyanide. While hydrogen sulphide easily decomposes the ferrocyanide in the absence of sodium bicarbonate, the addition of one per cent. of sodium bicarbonate completely prevents the decomposition.—Dr. W. Autenrieth, Arch. der Pharm., 1893, 99–109.

Solanaceous bases.—*Apoatropine* by treatment with hydrochloric acid according to the directions of Hesse (Am. Jour. Pharm., 1892, 644) for converting *atropamine* into *belladonnine* was found to form compounds which undoubtedly prove the identity of apoatropine and atropamine. The investigation also established that atropine by loss of one molecule of water is converted into apoatropine, and this in turn by dilute hydrochloric acid yields belladonnine, which

by boiling with alcoholic baryta solution, is converted into tropine and atropic acid.

Pseudohyoscyamine, a new alkaloid from *Duboisia myoporoides*, was separated from chloroform solution by addition of ether after first removing hyoscyamine and hyoscine as perfectly as possible by crystallization; the new alkaloid is lævogyre and forms small yellowish needles melting at 133–134° C., difficultly soluble in water and ether, easily soluble in alcohol and chloroform; it has the formula $C_{17}H_{23}NO_3$; the aurochloride melts at 176° C., the picrate at 220° C., while the platinochloride sinters at 116° and decomposes at 150°. By boiling with baryta a base isomeric but not identical with tropine and pseudotropine was obtained (the reddish yellow platinochloride which it forms at 210° C. becomes deeper in color and at higher temperature blackens without melting) along with tropic acid.—E. Merck, Arch. der Pharm., 1893, 110–123.

Champacol is the crystallizable camphor separating from the volatile oil of the fragrant champaca wood (*Michelia Champaca*, L.) cultivated in tropical India. In the pure state it forms long, felted, odorless needles, melting at 86–88° C.; soluble in alcohol and ether; it has the formula $C_{17}H_{30}O$. If insufficiently purified the crystals liquefy and the pleasant odor of the wood becomes prominent.—Ibid., 123.

Hydrargyrum thymolo-aceticum, when first placed upon the market had no definite chemical formula assigned to it; recent investigation shows it to be formed from two molecules mercuric acetate in which one acetyl group is replaced by the radical thymyl so that it has the following formula $Hg(C_2H_3O)_2 + Hg(C_2H_3O_2)(C_{10}H_{13}O)$.—Ibid., 123.

Adonite, a crystallizable constituent of *Adonis vernalis* present to extent of four per cent., has the formula $C_5H_{12}O_5$, and is apparently a new pentatomic alcohol. It is insoluble in ether and petroleum ether, has a neutral reaction, is very soluble in water, crystallizes in large transparent prisms, and has at first a sweet taste rapidly giving place to a rather benumbing sensation. It crystallizes from alcohol in small needles, melts at 102° C.; does not reduce Fehling's solution, nor become brown with alkalies, but yields with sulphuric acid a perfectly colorless solution, and heated upon platinum foil, gives off the odor of carmel.—Ibid., p. 129.

Corydalis cava alkaloids, extracted from the root with alcohol, were capable of separation into two groups, the stronger and weaker bases. Of the latter group the greater portion was found to consist of *corydaline*, well crystallizable in large prisms melting at 135° C. A small quantity of a difficultly soluble base was obtained crystallizable in interlaced needles, melting with decomposition at 218° C.; it is probably not identical with *corycavine* of Freund and Josephy. Of the stronger bases *bulbo-capnina* was easily purified by taking advantage of the difficult solubility of the hydrochlorate; the alkaloid melts at 199° and is distinguished from all the accompanying alkaloids by its solubility in an excess of potassium hydrate solution; *bulbo-capnina* is the main alkaloid, 2½ parts being present for 1 part *corydaline*. Second to *bulbo-capnina* in quantity is an amorphous alkaloid (also yielding an uncyclizable hydrochlorate), *corydine*, found in the mother-liquor from the first *bulbo-capnina* crystallization.—Ibid., p. 131-133.

Hydrastine bitartrate, $C_{21}H_{21}NO_6C_4H_4O_8 + 4H_2O$, recently prepared by E. Merck, crystallizes in white needles, is easily soluble in hot water, but difficultly soluble in cold water; it is of especial importance in the purification of the alkaloid, *hydrastine*.—Arch. der. Pharm., 1893, 134.

Carpaine, the alkaloid discovered by Dr. Greshoff in the leaves of *Carica Papaya*, L. (Am. Journ. Pharm., 1891, 230) is present in the young leaves to the extent of 0.25 per cent., while in old leaves only 0.07 per cent. is present. J. J. L. van Ryn, in operating with 80 kilos, obtained 60 grams of the alkaloid, which was obtained perfectly colorless by recrystallizing first from ether, later from alcohol. The properties, as described in the Am. Jour. Pharm., 1891, 230, were confirmed, but one correction being necessary; the crystals melt at 121° C. (corr.) instead of 115°; the alkaloid turns red litmus blue, but is indifferent to phenolphthalein; the strongest reagents were apparently without action upon the alkaloid. Sulphuric acid and bichromate of potassium gave a green coloration, but the acidified alkaloidal solution with a drop of potassium permanganate solution retained the red color for several hours. *Carpaine* has the composition, $C_{14}H_{25}NO_2$; the platinochloride, $(C_{14}H_{25}NO_2HCl)_2PtCl_4$; the aurochloride, $(C_{14}H_{25}NO_2HCl,AuCl_3)_2 + 5H_2O$; the halogen salts decrease in solubility in the order in which they are given:

$C_{14}H_{25}NO_2HCl$, $C_{14}H_{25}NO_2HBr$ and $C_{14}H_{25}NO_2HI$; the sulphate, $C_{14}H_{25}NO_2H_2SO_4 + 3H_2O$, owing to its solubility in water was not crystallizable, but by the addition of ether to an alcoholic solution large colorless prismatic crystals separated after a time. The nitrate, $C_{14}H_{25}NO_2HNO_3 + H_2O$, is only soluble to the extent of 2 per cent. in water, but if to a 1 per cent. solution of the hydrochlorate a few drops nitric acid be added, a separation of the nitrate occurs, showing the decreased solubility of this salt in hydrochloric acid. The observations made by Dr. v. Oesele established that, with the exception of the caffeine group, carpaine was the only digitalis substitute which by subcutaneous injection did not cause local irritation or abscesses, while internal doses of 0.025 gram per day did not show any advantage over digitalis. The hypodermic use of 0.006–0.010 gram daily or on alternating days is recommended; the effect of the hypodermic injection is noticeable in the course of a few minutes.—*Arch. der Pharm.*, 1893, 184–211.

Formalin is a 40 per cent. aqueous solution of formaldehyde; it is a disinfectant, can be used either in solution as a spray or as a vapor and resembles mercuric chloride in being a destroyer of bacteria and differs from it in being non-poisonous. For the permanent sterilization of bandages *formalith* is recommended; this constitutes a cartridge made of infusorial earth, which has the power of absorbing an equal weight of formalin; it is claimed that by placing formalith in bottles or boxes containing the bandaging material, this is perfectly and permanently sterilized. An interesting property of formalin is worthy of note. If placed upon animal skin it changes the latter into leather, making it non-porous and hard.—Dr. J. Stahl, *Pharm. Ztg.*, 1893, 173.

Formanilide, $C_6H_5NH CHO$, at a recent meeting of the Royal Medical Society, in Budapest, was praised by six physicians as an analgetic, anæsthetic, antipyretic, antineuralgic and as a hæmostatic combining therefore the properties of acetanilide, antipyrine and cocaine; the anæsthetic action of a 20 per cent. solution lasted 1–1½ hours, but was inferior to that obtained with cocaine, which, however, only lasted twenty minutes. Formanilide crystallizes in long, four-sided, flattened prisms, melting at 46° C., soluble in water and especially in alcohol.—(*Wiener Med. Presse*), *Pharm. Ztg.*, 1893, 160.

Salokoll, the trade name for phenocoll salicylate, has some therapeutic advantages over the hydrochlorate (Am. Journ. Pharm., 1891, 289). It is claimed to be a trustworthy antipyretic, anti-neuralgic, and antirheumatic, in doses of one to two grams.—Pharm. Ztg., 1893, 160.

Tolypyrene or *p*-tolyldimethylpyrazolon forms colorless crystals, melting at 136–137°, soluble in 14 parts of water, very soluble in alcohol. It has a very bitter taste. Towards ferric chloride and nitrous acid it reacts like antipyrene. As an antipyretic, four grams are as effective as 5–6 grams antipyrene.—Pharm. Ztg., 1893, 183.

Tests distinguishing tolypyrene and antipyrene, and which will also indicate mixtures of the two, are given by Dr. R. Stock: (1) Tolypyrene in *two per cent.* solution will give a precipitate with an excess of sodium hydrate; antipyrene solutions must contain at least *five per cent.* in order to precipitate with this reagent; (2) the melting point of antipyrene is 113°, of tolypyrene 136–137° C.; mixtures containing 10, 25 and 50 per cent. tolypyrene show the same melting point of 94° C.; with 75 percent. tolypyrene the greater portion melts at 94°, but complete liquefaction requires 120°; with 90 per cent. tolypyrene the mixture gradually melts between 100° and 130°.—Pharm. Ztg., 1893, 192.

Sodium Carbonate, in form of small crystals, is prepared according to a German patent, by adding to 100 parts of the effloresced carbonate 70 parts of water 80–90° C.; by mixing the doughy mass the carbonate unites with the water, swelling into a mass of fine crystalline needles, which after cooling can be at once put into suitable packages. A foaming preparation for washing is obtained if in the water used to mix with the soda, there be dissolved a desirable quantity of soap.—(Ztschr. f. angew. Chemie), Pharm. Centralhalle, 1893, 171.

Fatty oils in mineral oils may be detected if present to the extent of *one per cent.* by heating 15 grams of the sample with 100 cc. of a 10 per cent. alcoholic solution of potassium hydrate for one to two hours; after cooling, an equal volume of water is added and the mixture filtered through a water-wetted filter, the filtrate neutralized with hydrochloric acid and calcium chloride added when an insoluble calcium soap will separate out if a vegetable or animal fat was present in the sample. For quantitative work the method is also suitable,

providing the fat is present in not too large quantity, as the calcium soap in any quantity lumps together and prevents washing ; for this purpose the first filtrate and washings are concentrated to 100 cc., neutralized, precipitated with calcium chloride, the precipitate collected upon a weighed filter (dried at 100° C.), washed with as little water as possible to remove the chlorides, dried at 110° C. and weighed ; by ignition, the weight of CaO is found, which subtracted from the weight of the precipitate, gives the weight of the fatty acid anhydrides. To calculate the weight of the fat, the glycerin anhydride corresponding to calcium oxide must first be ascertained, which is done by multiplying the weight of the CaO by 0.774 ; then adding this and the weight of the fatty acid anhydrides, there results the weight of the fat in the quantity taken for analysis.—Dr. J. Klimont, Chemiker Ztg., 1893, 543.

Sucrol, the trade name finally adopted for *p*-phenetol-carbamide was noted in the Am. Jour. Pharm., 1892, 611 ; it is best adapted for its uses in a fine crystalline form. It melts at 160°, is soluble in alcohol, ether, hot hydrochloric and acetic acids; 100 cc. water at 20° dissolve 0.16 gm., at 80° 0.65 gm.; it has about 200 times the sweetening power of sugar. There is some difficulty in moistening the *powdered* sucrol, but this is overcome by using it in minute crystals ; used for sweetening liquids, like tea, coffee, etc., the hot liquids should be poured on the sucrol previously placed in the cup. In pharmaceutical use as a sweetener, sucrol has not the power of overcoming the intensely bitter taste of drugs ; a solution containing quinine sulphate 1.0, sulphuric acid six drops, distilled water 100.0 and sucrol 0.1 tastes intensely bitter, acid and sweet at the same time ; in a powder containing morphine hydrochlorate 0.05, starch 2.50, and sucrol 0.05 the bitter taste is disguised better than is possible with sugar ; in substituting sucrol for sugar as in the above formula some inert powder must be introduced to make up the quantity. Physiological experiments by Dr. Paschkis proclaim sucrol a harmless substance, it not interfering with digestion, respiration or circulation ; administered for some time the urine remains normal, traces of sucrol are only to be found in it after taking large doses (0.5 or more). As a test for sucrol, Dr. Berlinerblau boils for a short time a small quantity in a test tube with 2-3 drops each of carbolic and sulphuric acids ; after cooling the syrupy, red liquid is poured into half a test-tubeful of water, thoroughly mixed and

then either sodium or ammonium hydrate solution added in such a way as to form a distinct layer without mixing; at the line of contact there is first produced a blue ring, which intensifies upon standing and later spreads throughout the alkaline solution; using sodium hydrate the color has a tinge of violet, with ammonium hydrate a pure blue. In complex mixtures the sucrol should first be extracted with ether and the ether-residue used.—(Therap. Blaetter)
Oesterr. Ztschr. f. Pharm., 1893, 261.

Crude carbolic acid and wood tar can be made soluble in water by substituting crude oleic acid for the powdered rosin in the formulas given in the Am. Journ. Pharm., 1893, 221. Using the so-called 100 per cent. crude carbolic acid, a product results, soluble in any portion of water and makes a clear solution with petroleum ether. Using the 50 per cent. carbolic acid it was impossible to get a product dissolving in water or even forming an emulsion. *Birch-tar*, by the modified formula, gave an almost solid mass, which, with water, gave after some time, a turbid solution; but, here again, no proportions could be ascertained so as to make a clear solution. *Fir-tar*, however, by the modified formula, gave a satisfactory preparation.—E. Hirschsohn, Pharm. Ztschr. f. Russl., 1893, 148.

RISE OF SALT SOLUTIONS IN BIBULOUS PAPER.¹

By E. FISCHER AND E. SCHMIDMER.

Schönbein's experiments have shown that when bibulous paper is dipped into an aqueous solution of a salt, the water rises more quickly than the salt, and that the relative height attained by the latter is different for different substances; it is possible, therefore, to recognize the presence of the several constituents of a solution by taking advantage of this difference in behavior. The authors are of opinion that the separation referred to is brought about by the difference in the diffusibility of the dissolved substances, a view which is supported by the fact that in the case of two salts, the one with the greater diffusion velocity rises more rapidly in the bibulous paper; the diffusion phenomena of all solutions which moisten bibulous paper can, in fact, be studied in this way just as well as with the aid of membranes. The apparatus employed for the

¹ Annalen, 272, 156-169; Jour. Chem. Soc., 1893, Abstr. ii, 109.

purpose consists of a glass tube, in which six cylindrical rolls of bibulous paper are placed end to end, so that they are in close contact with the walls of the tube and with one another; the end of the tube is then dipped into the solution to be examined, and kept vertically in this position at the ordinary temperature until the fifth roll is thoroughly moistened, which is usually the case at the end of three or four days' time. The glass tube is then broken at the points where the rolls touch one another, the papers separately extracted with water, and the solutions examined.

Employing a solution of sodium chloride (10 grams) and barium chloride (10 grams) in 100 cc. of water, the proportion of the former to the latter expressed in grams was found to be 1.022, 1.230 and 1.364 in the rolls 1, 3 and 5 respectively, showing that the more diffusible sodium salt rises more rapidly than the barium salt.

With a solution of crystalline ferrous ammonium sulphate (10 grams) in 100 cc. of water, the proportion of iron to ammonia in the fourth roll was found to be 1:1.686 when the proportion in the double salt is taken as 1:1; with a cold saturated solution of the same salt, the proportion in the fourth roll was 1:1.004; and in the fifth, 1:0.993. Similar results were obtained with solutions of ferrous potassium sulphate and nickel potassium sulphate; the dilute solutions showed a considerable amount of dissociation, whereas in saturated solutions the dissociation was inappreciable.

Further experiments carried out in a similar manner showed that the double salts formed by mercuric chloride with the chlorides of sodium and lithium are decomposed by water, but not by alcohol; mercuric ammonium chloride, however, is not decomposed by either solvent.

The following double salts, $\text{NaH}(\text{NH}_4)\text{PO}_4 + 4\text{H}_2\text{O}$; KCN ; $\text{KNaC}_4\text{H}_4\text{O}_6 + 4\text{H}_2\text{O}$, do not undergo dissociation in aqueous solution; the compound of dextrose with sodium chloride, $2\text{C}_6\text{H}_{12}\text{O}_6 + \text{NaCl}$, on the other hand, is partially separated into its components.

From experiments with solutions of naphthalene picrate, and of methylindole picrate in acetone and in alcohol, it would seem that no decomposition takes place.

The diffusion phenomena of ferrous ammonium sulphate, of the compound $2\text{C}_6\text{H}_{12}\text{O}_6 + \text{NaCl}$, and of mercuric sodium chloride were also examined with the aid of Rüdorff's apparatus; it was found

that although the separation of the components of the first two substances in a given time is more effectively accomplished with the aid of membranes than with bibulous paper, the contrary is true in the case of the mercuric sodium chloride.

THE PHOTOGRAPHIC PROPERTIES OF CERIUM SALTS.

BY MM. AUGUSTE AND LOUIS LUMIÈRE.

We know that cerium yields two principal series of salts. The former are very stable, while the ceric salts are brought back to the lower stage of oxidation even by feeble reducing agents. Some among them, more especially the organic salts, are even reduced spontaneously as soon as formed, so that hitherto it has not been found possible to isolate them.

The easy reductibility of the ceric salts has led us to study the action of light upon these substances, and we have been able to observe that this action effects a rapid reduction which may serve as a basis for the establishment of interesting photographic procedures.

Among the mineral salts which have yielded us the best results we may mention ceric sulphate and nitrate obtained by dissolving ceric hydroxide in sulphuric or nitric acids. The aqueous solutions of these salts have served to saturate sheets of paper, suitably sized and coated with a thin layer of gelatin, which the cerium salt colors an intense yellow. After drying in the dark, the papers were exposed to light under a positive proof. In all the transparent parts the luminous rays reduce the ceric salt to the cerous state, and the paper is decolorized at these parts. This progressive decoloration enables us to follow the action of the light and to stop the impression at the proper moment.

The proof when thus obtained must be treated with a reagent capable of differentiating the cerous from the ceric salt, so as to accentuate and fix the image. In an analogous process with the manganic salts, which we have formerly published (*Bulletin de la Soc. Française de Photographie*, p. 218, 1892), we used the striking oxidizing properties of the manganic salts to form insoluble coloring matters with a great number of substances of the aromatic series. In the same manner, if we treat the proofs with cerium salts, with these reagents we form and fix coloring matters at the

points where the ceric salt has not been reduced by the light. It then suffices to eliminate, by washing, the excess of the reagent as well as the cerous salt to obtain a proof distinctly fixed. It is important that the coloring substance produced should be insoluble, so that it may not be carried away by washing.

We found, on considering their photographic utilization, and on comparing the action of the ferric, cobaltic, manganic and ceric salts upon a great number of substances of the aromatic series, that the ceric salts are capable of yielding colored reactions much more numerous than the salts of the other metals.

Among the most characteristic reactions we may mention the following :

In an acid solution the proofs are gray with phenol, green with aniline salts, blue with naphthylamine α , brown with amido-benzoic acid, red with parasulphanilic acid, green with the salts of orthotoluidine; etc. On treatment with ammonia the color changes, it becomes, for instance, violet with aniline, red with methylamine, etc.

Photographic papers prepared with cerium salts possess a much greater sensitiveness than that of the preparations with ferric or manganic salts.—*Comptes rendus*, cxvi, p. 574; *Chem. News*, April 21, 1893, p. 188.

REACTIONS OF FERRIC SALTS WITH THIOCYANATES.¹

BY H. M. VERNON.

In these investigations, colorimetric observations were adopted for comparison, and were made in vertical, flat-bottomed tubes, by comparing the solution to be tested with an adjustable column, either of a 0.1 per cent. solution of picrocarmine, or, in some cases, of a dilute solution of ferric thiocyanate, prepared from lithium thiocyanate and excess of ferric chloride. Solutions were examined containing 1, 2, 4, 7, 11, 18, 30 and 100 equivalents of ferric chloride to 1 part of potassium thiocyanate, and diluted to various degrees, ranging from 2- to 120-fold. In equivalent quantities, these two reagents react almost completely at infinite concentration, to form ferric thiocyanate; but solutions less dilute than those mentioned above were too deep in color, whilst solutions containing one or two equivalents of ferric chloride, when diluted above 40 times,

¹ *Chem. News*, 66, 177-179, 191-193, 202-203, 214-215; *Jour. Chem. Soc., Abstr.*, 1893, i, p. 122.

were too weak in tint for colorimetric examination. The decrease in ferric thiocyanate coloration, resulting from the dilution of the solutions from 8- to 120-fold, in the strongest solution, was 27 per cent., in the 30:1 solution over 60 per cent., in the 18:1 solution 73 per cent., whilst diluting from 2- to 32-fold in the case of the 1:1 solution resulted in a reduction of the coloration, amounting to 94 per cent.; the stability of the ferric thiocyanate, therefore, appears to vary regularly with the amount of ferric chloride present; moreover, the amount of ferric thiocyanate formed in these solutions varies with the dilution in accordance with the law of mass. The action of ferric chloride is twofold; in most cases it forms a solution in which the ferric thiocyanate is more stable than in pure water, but in very strong solutions, it exerts a decolorizing and presumably a destructive action on the deep-colored thiocyanate.

The examination of a similar set of solutions, in which the proportion of ferric chloride was kept constant, and that of the potassium thiocyanate varied, indicated that, although the ferric thiocyanate was more stable in a solution of potassium thiocyanate than in water, yet the decrease in color on dilution did not, in this case, follow the law of mass, probably owing to the presence of impurities.

Numerous other experiments with various ferric salts and thiocyanates led to the following conclusions: That the color reactions of ferric chloride, nitrate, sulphate, tartrate, citrate, and acetate with potassium, ammonium, sodium, lithium, calcium, and barium thiocyanates, indicate that the formation of ferric thiocyanate in these cases is dependent on two factors, one being the nature of the acid of the ferric salt, the other the nature of the base of the thiocyanate; the former exerting an action somewhat in accord with the relative affinities of the acids, whilst the latter shows no such relationship. In all these cases, except with the acetate, the color of the ferric salt caused no inconvenience.

Heating the solutions increases the activity of the various reactions, and when those that favor the formation of ferric thiocyanate predominate, an increase of color is observed, and *vice versa*. Therefore, by heating at 20°, 30°, 40°, 50° and 60°, or when decomposition ensued at some intermediate temperature, an increase of color is observed with thiocyanates and ferric salts of monobasic acids, and a decrease with ferric salts of polybasic acids.

SOME AMERICAN "NOVELTIES."¹

A New York firm has been good enough to favor the American public with an altogether peculiar kind of "Novelties" of which we deem it necessary, in the interest of the good repute of our trade, to say a few words.

"*Ambrettaria*, a powerful synthetic product for perfumery." Although the "discoverers" claim this to be "a product of our chemical laboratory," "*Ambrettaria*" is nevertheless no definite scientific body at all, but a simple mechanical mixture of 5 parts of musk-seed oil (ambrette oil), 95 parts of antifebrin (acetanilid), and traces of artificial musk. These ingredients were recognized and isolated by us with absolute certainty. We determined the melting point and other characteristic features of the antifebrin.

"*Oil Catalpa*, a powerful synthetic product for perfumery." The manufacturer of this product most obligingly condescends to offer perfumers, under this new name, a terpineol, to which a few drops of ylang-ylang oil have been added, at the "cheap" rate of \$10 per pound. It is to be hoped that no perfumer will fall into the trap.

"*Oil Narcissus*, a powerful synthetic product for perfumery." The person who imagines this product to provide the scent of narcissus will be sadly deceived. This stuff is nothing more or less than the parts of light specific gravity which are obtained as a by-product in the manufacture of terpineol. As this material is of no value whatever in perfumery, we use it in our works for cleaning parts of machinery. The price asked for this product is the trifling one of \$7.50 per pound.

"*Oil Ylang-Ylang, artificial*." This product does not by any means solve the scientific problem of the synthesis of ylang-ylang in a practical manner, which would be a matter of great importance. On the contrary, we have here to deal with a bald and primitive mixture of cananga oil and Peruvian-balsam oil (cinnamein).

We are quite certain that no one could be found with sufficient assurance to try to place such products upon the European market. Any attempt to do so would only provoke mirth. And the house that dares to place such compounds before the American perfumers surely under-estimates grossly the intelligence of its would-be customers.

¹ From Semi-Annual Report of Schimmel & Co., April, 1893, p. 70.

CEPHALANTHIN.¹

BY CARL MOHRBERG.

By extracting *cephalanthus* bark with boiling water and fractionally precipitating the extract with lead acetate, in three fractions, there were obtained in the first cephalanthin and coloring matters, in the second a tannin and in the third a saponin. But the greater portion of the cephalanthin is contained in the pressed bark, and is obtained by boiling this with lime water, precipitating the lime with carbonic anhydride, and, finally, the cephalanthin with hydrochloric acid. It is very bitter, even in dilution of 1 : 15,000, very soluble in alcohol, ethyl acetate, ammonia and soda, slightly in hot and cold water, ether and chloroform, not at all in benzene and light petroleum. It is a feeble acid, and displaces carbonic anhydride from carbonates. Its composition is $C_{22}H_{34}O_6$; it begins to liquefy at 177°, and melts at 180.1° (corr.), and in alkaline solution has $[a]_D = 20.25^\circ$. Strong sulphuric acid colors it orange, hydrochloric acid violet, sulphovanadic acid pink, dilute gallic acid or strong sulphuric at 70° at first red, then violet, α -naphtholsulphonic and thymolsulphonic acids violet or reddish-violet. Acids decompose it into a sugar, $C_6H_{12}O_6$ (whose phenylosazone melts at 196–198°), and an acid substance, *cephalantein*, $C_{16}H_{28}O_3$; it is thus a glucoside.

The *cephalanthus* tannin mentioned above is a reddish-yellow powder, soluble in alcohol and hot water, and gives a green coloration with ferric salts. It is probably a mixture of "true tannic acid" with another substance, the cephaletin of Claassen. The *cephalanthus* saponin is a poison which dissolves the blood corpuscles; it is not very active, however.

Cephalanthin, when injected, acts as a poison, dissolving the blood corpuscles, the coloring matter of which goes into the serum and the urine as oxyhaemoglobin, and is then changed into methaemoglobin. Cramp, vomiting and paralysis appear, and jaundice, caused by an enormously increased secretion of bile. Among the earlier symptoms are movements of the intestines, but neither the heart, vagus nerve, nor vasomotor system is affected. The iron

¹ *Chem. Centr.*, 1892, ii, 363; from *Arb. Pharm. Inst. Dorpat*, 8, 20–50; *Jour. Chem. Soc., Abstr.*, 1893, i, p. 112; compare also E. M. Hattan, *Amer. Jour. Phar.*, 1874, p. 310, and E. Claassen, *Phar. Rundschau*, 1889, p. 131.

separated out in the liver gets into the spleen, lymphatic glands and marrow, and is used up in the formation of blood ; a part goes into the kidneys.

CYTISINE AND ULEXINE.¹

BY A. PARTHEIL.

The author has already stated (1891) that cytisine from laburnum and other varieties of *Cytisus* is identical with Gerrard's ulexine from *Ulex europaeus*, and that it has the formula $C_{11}H_{14}N_2O$. For the preparation of the alkaloid from either source, the pulverized seeds are extracted in a percolator with 60 per cent. alcohol acidified with acetic acid ; chloroform is to be recommended for extracting the free base, but its application, in the manner described by Buchka and Magalhaës (1891), is not desirable, as an emulsion is formed. Gerrard and Symon state that a second base is present along with ulexine in the seeds of *Ulex europaeus*, but the author failed to recognize it ; he has, however, separated choline from the seeds of the *Cytisus* species.

Small quantities of cytisine base may be freed from the accompanying coloring matters by crystallization from boiling light petroleum ; the pure base crystallizes from absolute alcohol in large, colorless, anhydrous prisms which are not deliquescent, melts at 150-153°, and is readily soluble in water, alcohol and chloroform, less so in benzene and amyl alcohol, almost insoluble in cold light petroleum, and insoluble in pure ether. Its specific rotatory power in aqueous solution is $[a]_{D17}^{\circ} = -119.57$, and analysis confirmed the formula given above. For the detection of the alkaloid, Magalhaës' reaction serves ; this consists in adding thymol to a solution of cytisine in concentrated sulphuric acid and heating, when a yellow coloration, finally passing into an intense red, is produced.

The author next describes a number of derivatives of cytisine, most of which are already known, and compares them with the corresponding derivatives of ulexine, thereby proving the identity of the two alkaloids. Among these are the nitrate, $C_{11}H_{14}N_2O \cdot HNO_3 + H_2O$, which has a specific rotatory power in aqueous solution $[a]_{D17}^{\circ} = -82.4$, the two platinochlorides ($C_{11}H_{14}N_2O)_2 \cdot H_2PtCl_6$ and $C_{11}H_{14}N_2O \cdot H_2PtCl_6 + 2\frac{1}{2} H_2O$, the aurochloride melting at 212-213°, the acetyl derivative melting at 208°, and the methiodide

¹ Arch. Pharm., 230, 448-498 ; Jour. Chem. Soc., 1893, Abstr. i, p. 119.

which melts at 270° . Methylcytisine melts at 134° ; the platino-chloride crystallizes with $2\frac{1}{2}$ mols. H_2O , and the aurochloride melts at 196° . Ethylcytisine is a yellow liquid, and yields a platino-chloride which crystallizes with 1 mol. H_2O . Magalhaës' dimethyl-cytisine forms a platinochloride crystallizing with $2\frac{1}{2}$ mols. H_2O , and gives rise to dimethylcytisine methiodide when heated on the water-bath with methyl iodide; the methiodide decomposes on boiling with concentrated aqueous potassium hydroxide with the evolution of trimethylamine, whilst chloroform extracts from the cold solution a base giving an amorphous, yellow platinochloride, $(C_{10}H_{13}NO_2)_2H_2PtCl_6$. On distilling cytisine with soda lime, a base, $C_9H_{13}N$, probably a pyridine derivative, is obtained; this is, perhaps, related to the base $C_{10}H_{13}N_2O$, just mentioned. The alkaloid gives no evidence of the presence of the group CO, in that it does not react with phenylhydrazine.

The precise constitution of cytisine is still obscure, but its behavior towards methyl iodide, acetic anhydride and nitrous acid shows that one of its nitrogen atoms is in secondary combination; the second nitrogen atom is either in tertiary or quaternary combination. That the oxygen atom exists neither in the form of methoxyl nor hydroxyl is proved by the fact that methylcytisine does not yield an acetyl derivative. The research is being continued.

THE COMPOSITION OF SOME COMMERCIAL SPECIMENS OF ACONITINE.

BY WYNDHAM R. DUNSTAN AND FRANCIS H. CARR,
Assistant in the Research Laboratory of the Pharmaceutical Society.

In our search for the most readily available source from which to obtain pure aconitine, we examined a number of commercial specimens of this alkaloid, English and foreign. For eleven of these specimens (I-II) we are indebted to Dr. J. W. L. Thudichum, who collected them some years ago, and kindly offered them to us for examination. Dr. Thudichum found that these specimens varied enormously in toxic power, many being inert, others more or less poisonous, whilst only one or two were highly toxic. The remainder of the specimens have been purchased during the past two years.

The process employed in examining them was essentially that described in connection with the separation of isaconitine from the

total alkaloids of *Aconitum Napellus*, by means of which it was possible to ascertain the presence of aconitine and isaconitine, and also of aconine and homisaconitine (homonapelline), as well as to form an approximate estimate of the proportion of crystalline aconitine to that of the amorphous alkaloids. In several instances the amount of aconitine present was too small to allow of its isolation either as crystalline base or crystalline salt. When this was the case, the presence or absence of aconitine was ascertained by observing whether a dilute solution of the mixed salts produced the characteristic tingling sensation on the tongue. The difficulty of separating the alkaloids has often been great, owing to the small amount of some of the specimens.

The results are as follows:

(1) "Aconitine, Pure" (German).—A yellowish-white, amorphous powder which melted indefinitely near 107° . When dissolved in dilute hydrobromic acid, it furnished a highly colored solution. From this liquid, pure isaconitine salt was eventually obtained, in amount corresponding with the presence of about 20 per cent. of the alkaloid in the original substance. Aconitine was present only in relatively small quantity, and it was not found possible to isolate it. Aconine, and apparently homisaconitine, were also present.

(2) "Aconitine, Crystallized" (French).—A white, crystalline powder melting near 187° . It completely dissolved in cold water, and proved to be the nitrate of an alkaloid, not the base itself. The alkaloid was regenerated and dealt with in the usual manner. A considerable quantity of pure aconitine hydrobromide was obtained, and from this, pure crystalline aconitine (m. p. $188-189^{\circ}$) was prepared. A smaller quantity of isaconitine hydrochloride was isolated, whilst other amorphous bases (aconine, homisaconitine, etc.) were observed in small quantity. The nitrate, of which the original substance was composed, contained about 70 per cent. of aconitine salt.

(3) "Aconitine, Pure" (English).—A yellowish-white, amorphous substance melting indistinctly near 88° . Its solution in dilute hydrobromic acid was highly colored. A considerable quantity of alkaloid soluble in ether was isolated; this was chiefly isaconitine. No crystalline aconitine salt could be isolated from the small quantity of material at our disposal. The physiological action of the acid solution indicated that a small quantity of this alkaloid was present, but the specimen was chiefly composed of amorphous bases.

(4) "Aconitine, Pure" (German).—A dirty white, amorphous powder melting at 111° . The solution in dilute acid was yellow. No crystalline aconitine salt could be isolated, although a small quantity of the alkaloid was detected by its physiological action. Some isaconitine was obtained in addition to other amorphous alkaloids, including aconine.

(5) "Aconitine, Crystallized" (German).—A collection of small white crystals melting at 170° . It yielded a considerable quantity of crystalline aconitine hydrobromide, from which the pure crystalline base melting at $188-189^{\circ}$ was regenerated. Isaconitine was also obtained. Rather more than two-thirds of the original material was aconitine.

(6) "Napelline" (German).—Napelline was the name given by Hübschmann to what seems to have been a mixture of the amorphous alkaloids of *Aconitum Napellus*. A brown amorphous powder melting near 120° , and not completely soluble in dilute acid. The highly colored solution furnished some isaconitine. It also contained aconitine and considerable quantities of amorphous alkaloid, partly aconine. The original substance was probably the total alkaloids of *A. Napellus*, from which some of the aconitine had been removed.

(7) "Aconitine, Pure" (English).—A yellowish, amorphous powder melting at 85° . It partially dissolved in dilute acids, forming a colored solution from which no crystalline aconitine salt could be isolated, although the presence of a small quantity of this alkaloid was detected by its physiological action. About two-thirds of the alkaloid consisted of amorphous alkaloids, the remainder being resinous substances, apparently non-alkaloidal, and a little aconine.

(8) "Aconitine from *A. Napellus*" (German).—A yellow, amorphous powder melting between 105° and 110° . Its solution in dilute acid was colored. A considerable quantity of crystalline isaconitine salt was separated, but the amount of aconitine was too small to admit of isolation. More than one-fifth of the original substance turned out to be isaconitine, the remainder being other amorphous bases, a small quantity of aconitine, and some non-alkaloidal substance.

(9) "Aconitine" (English).—A nearly white, amorphous powder, dissolving in dilute acid, forming a dark colored solution. The substance was chiefly composed of amorphous bases with very little aconitine.

(10) "Aconitine Muriate" (German).—A yellow, uncrystalline powder melting indistinctly at 86° . Its solution in water was highly colored, and produced only a feeble tingling sensation on the tongue. It was chiefly isaconitine hydrochloride contaminated with the hydrochlorides of other amorphous alkaloids, and with a trace of aconitine hydrochloride.

(11) "Aconitine Sulphate" (German).—A reddish, crystalline powder melting indefinitely below 128° . Its aqueous solution was red. The alkaloid was regenerated, and was proved to be chiefly isaconitine with a little aconitine.

(12) "Aconitine Nitrate" (German).—A dark yellow, amorphous substance melting near 62° . The aqueous solution was yellow. It furnished no crystalline alkaloid, but the existence in it of a small quantity of aconitine was revealed by its physiological action. Some isaconitine was isolated, but it was contaminated with other amorphous alkaloids.

(13) "Aconitine, Pure, from *Aconitum Napellus*" (English).—A yellowish white, crystalline powder melting at $186-187^{\circ}$. It dissolved completely in dilute acid, forming a yellow solution. A large quantity of pure aconitine was isolated, together with a small quantity (about 3 per cent.) of isaconitine.

(14) "Aconitine, Pure, Crystallized, from *Aconitum Napellus*" (German).—A collection of small, nearly white, distinct crystals melting at 187.5° . It dissolved in dilute acid, forming an almost colorless solution, which furnished a large quantity of pure aconitine salt. The regenerated alkaloid melted at 188.5° . This specimen consisted of almost pure aconitine.

(15-17) "Aconitine, Amorphous, from *Aconitum Napellus*" (German).—Three separate specimens of this material were examined. It is a yellow, amorphous powder, dissolving in dilute acid with the production of a colored solution. In each case aconitine, isaconitine, homisaconitine, and aconine were isolated, but the amount of aconitine obtained varied greatly; in one instance, as much as 20 per cent. of the substance was found to be aconitine, whilst in another as little as 5 per cent. was present. These products appear to represent the total alkaloids of *A. Napellus*.

In the light of these results, it is not surprising to learn that great variations have been observed in the toxic power of commercial specimens of aconitine.

For medicinal purposes, nothing should in future be employed as aconitine but the pure crystalline alkaloid melting at 188–189°, and having the other characteristic properties recorded in Part I (Trans., 1891, 59, 271) of this enquiry (see also on this point, *Pharm. J.*, 3, 23, 765).

Of the specimens now examined, only two (13, 14) approach this standard, and are entitled to be called aconitine. It is clear from the results which are here recorded that the fact that a specimen of this alkaloid is crystalline cannot alone be accepted as sufficient evidence of purity, as some physiologists have assumed. In the case of the salts, the crystalline nature of the specimens is no criterion that the substance is an aconitine compound, since the salts of isaconitine are also crystalline.

It has already been remarked that most of the specimens described in this paper were collected some years ago, and since then, especially during the last two years, a marked improvement has occurred in the quality of commercial aconitine. It is now possible to purchase in commerce a nearly pure crystalline aconitine, represented by specimens (13) and (14), although the crude, amorphous alkaloid is still largely prepared and sold, because this satisfies the present requirements of the British Pharmacopœia.

Until now, it has not been possible to make anything approaching to a chemical examination of commercial aconitine, since the nature and properties of its chief constituents were either unknown or open to doubt. Even now it is not possible to make a complete examination, as there is certainly one, probably two alkaloids which still require investigation, making in all four, or possibly five, distinct natural alkaloidal products from *A. Napellus*.

No method is at present known for the quantitative determination of the highly toxic alkaloid aconitine. Now that isaconitine is known to be a constituent of the plant, and since it, like aconitine, furnishes benzoic acid when hydrolysed, the method suggested by Wright for the estimation of aconitine in the crude alkaloid, by calculating from the weight of benzoic acid obtained on hydrolysis, can no longer be accepted as valid.—Research Laboratory of the Pharmaceutical Society, London.—*Jour. Chem. Soc.*, 1893, pp. 491–495.

DETECTION OF EXTRACTED TEA.

By W. A. TICHOMIROW.

The author has made an examination of such tea as is used for the falsification of genuine tea. If dry extracted tea is covered with a cold, saturated solution of copper acetate, the blue color of the liquid remains unchanged for months. With dry fresh tea (not extracted), the original blue color of the liquid is found on the second day to have been changed into a greenish blue, and subsequently to a pure green. The leaflets of the fresh (not extracted tea), remain strongly contracted and rolled up even after steeping in the water for weeks, whilst tea which has been previously extracted unrolls perfectly without any previous immersion in water.

The characteristic distinction between extracted and fresh tea is shown by the idioblasts. If microscopic sections of leaves which have been steeped for from 1 to 4 days in a cold saturated solution of copper acetate are touched with a drop of the "liquor ferri acetici" of the Russian Pharmacopoeia (specific gravity 1.134 to 1.138), and examined under the microscope, all the histological elements which contain tannin have taken a deep, black-blue color. The tannins are fixed in their normal places by the previous treatment with copper acetate.

In leaves which have been previously extracted, the cell walls have been previously permeated by the tannin dissolved in water, whilst in fresh tea they remain colorless, because the tannins are found normally not in the idioblasts, but in the surrounding parenchyma cells. The shrivelling and the inability to unroll in water the tea-leaves which have not been previously extracted with hot water must depend on the formation of a dense, solid copper tannate, insoluble in water. It is a kind of tannin which prevents the turgescence of the tissues.

E. Hanousek (*Zeit. f. Nahrungsmittel-Untersuchung*) detected the appearance of a green color also in extracted tea, and in his experiments the idioblasts did not show sharply and consistently the expected microchemical reactions, probably in consequence of the complete exhaustion of the leaves. Hanousek's further experiments had the purpose of determining the refractive index of the infusion of tea as a distinction between extracted and recent tea.

As these experiments are not completed, and as the determination of the proportion of extract afford a more certain basis than the indices of refraction which do not differ very widely among themselves, we must refer to the original.—*Pharm. Zeit. Russland's; Chem. News*, April 28, 1893.

DAPHNIDIUM CUBEBA, NEES.

By E. M. HOLMES, F.L.S.

Curator of the Museum of the Pharmaceutical Society of Great Britain.

Some degree of uncertainty has hitherto been attached to the plant yielding the false cubebs, referred by most authorities on *materia medica* to *Daphnidium Cubeba*. This name was given by Nees van Esenbeck ("Syst. Laurinearum," p. 615) to a plant cultivated in Cochin China, and described by Loureiro ("Flora Cochinchinensis," I, p. 307, No. 7) under the name of *Laurus Cubeba*. The plant does not, however, appear to have been seen by Nees, who simply quotes Loureiro's description. Hanbury, in his "Notes on Chinese Materia Medica," (*Pharm. Journ. [2]*, vol. iii, p. 206) gives an illustration of the fruit, taking as his guide for adopting the name of *Daphnidium Cubeba*, the known laurineous structure of the fruits and their likeness to cubebs, but stating that the plant was unknown to modern botanists. Subsequently, Dr. F. Porter Smith¹ followed Hanbury's identification. That some doubt existed in the minds of the authors of "Pharmacographia" on this identification is, however, evident from the remark in the second edition of that work, "In the south of China the fruits of the *Laurus Cubeba*, of Loureiro, have frequently been mistaken for cubebs. The tree which affords them is unknown to modern botanists. Meissner refers it doubtfully to the genus *Tetranthera*." In De Candolle's "Prodromus" (vol. xv, pt. I, p. 199), Meissner remarks concerning *Daphnidium Cubeba*, Nees, "Antheræ 4, locellatae (hinc certe non Daphnidii generis)." By Bentham and Hooker, f. ("Gen. Plant." vol. iii, p. 101) the genus *Tetranthera* is sunk under *Litsea*, therefore the present name of *Laurus Cubeba* should be *Litsea Cubeba*, Benth. and Hook. f.

A surer and somewhat more exact means of identifying the fruits with the plant yielding them has recently come into my hands through the kindness of our corresponding member, Professor van

¹ "Chinese Materia Medica," pp. 79, 83.

Eeden, of Haarlem. I had asked Dr. Van Eeden for specimens of any plants yielding cubebs that he might be able to procure. In response to this request, he sent a very fine series of plants, one of which, named Krangéan, and identified by him as *Tetranthera citrata*, Nees, was, he informed me, the source of a fruit that is regularly sold as cubebs. This at once suggested to me a comparison of the fruits with those of the so-called *Daphnidium Cubeba*. Except in the stronger verbena-like taste I could perceive no difference in these fruits. At my request Dr. A. De Wevre, who has been making a histological study of the true and false cubebs in the Museum of the Society, cut some sections of Dr. Van Eeden's specimen, of Dr. Porter Smith's specimen of *Daphnidium Cubeba*, and of the *Daphnidium Cubeba* in the Museum of the Society, derived from the same parcel as that examined by Mr. J. O. Braithwaite (*Pharm. Journ.*, [3], xvii, p. 231).¹ The structure of all three proved to be identical. As Dr. De Wevre will subsequently publish in his thesis on cubebs the details of the structure of this fruit, it is not necessary to give them here. It will be sufficient for purposes of identification to remark that the layer of sclerogenous cells of the testa in *Tetranthera citrata* is composed of extremely narrow cells without a recognizable lumen, whilst that of *Piper Cubeba* is formed of large oblong cells having a well-marked lumen. It may be assumed, therefore, as proved that the so-called *Daphnidium Cubeba* of commerce must in future be referred to *Litsea citrata*, Bl. ("Bijdrag," p. 565), but that the identity of that plant with the *Laurus Cubeba* of Loureiro is uncertain.

It is further of interest to remark that the fruits of *Litsea citrata* are identical with the "citronelle fruits" distilled by Messrs. Schimmel & Co., under the name of *Tetranthera citrata*, which are stated by them to yield citral, the flavoring principle of oil of lemon, to the extent of 30 per cent. of the oil. Citral has an odor between that of lemon and verbena, and it is remarkable that Mr. J. O. Braithwaite, in his examination of the fruits of *Daphnidium Cubeba*

¹ I have communicated with Messrs. Braithwaite and Farr, who admit that my interpretation of the structure of the fruit is the correct one, and that the description they have given is incorrect, they having been misled by imperfectly cut sections. It may be mentioned that owing to the extreme hardness and fragility of the testa as compared with the soft tissue of the pericarp it is extremely difficult to make a good section of the fruit.

(Pharm. Journ. [3], vol. xvii, p. 231) obtained a volatile oil having an agreeable odor between that of the oils of lemon and verbena. This odor and flavor become weaker when the fruits are kept, and this fact may perhaps account for the similarity of the "citronelle fruits" with those of *Daphnidium Cubeba* having hitherto remained unnoticed.

Dr. Greshoff found the alkaloid laurotetanine in the fruits of *Tetranthera citrata*, Nees, and an alkaloid was also found by Mr. J. O. Braithwaite in those of *Daphnidium Cubeba*. It must be admitted, however, that the same reactions were not obtained by both chemists, nor does the sp. gr. of the volatile oil obtained by Mr. Braithwaite agree exactly with that given by Messrs. Schimmel & Co. for the volatile oil of *Tetranthera citrata* (Phar. Journ. [3], vol. xix, p. 327). These differences, however, may have been due to differences in the mode of operation, and further experiments may confirm their identity. The use of the fruits by the Chinese probably depends partly on the properties of the volatile oil and partly on those of the alkaloid. It may be hoped that the alkaloid, obtainable from the fruits after distillation, may be extracted and its therapeutical properties examined. Being at present a waste product, it could probably be obtained in quantity at a moderate cost.—Pharm. Jour. and Trans., April 19, 1893, p. 846.

NOTES ON ESSENTIAL OILS.¹

Camphor oil.—Since the examination of this oil by Messrs. Schimmel, and the publication of their suggestions as to the practical application of its constituents, in 1885, considerable attention has been directed to it, but the importation from Japan has fallen off. As a material for artists the more volatile portion has been found very useful, as its capacity for dissolving resins is greater than that of turpentine or any other essential oil.

Cassia Oil.—The previous reports² have furnished ample information as to the source and preparation of this oil, but there is still some uncertainty as to the conditions influencing its quality. Oil containing only from 45 to 55 per cent. of cinnamic aldehyde has

¹ From the *Bericht* of Messrs. Schimmel & Co., for April, 1893; Pharm. Jour. and Trans., 1893, p. 849.

² See *Pharm. Journ.* [3], xx, 264, 836; *Amer. Journ. Pharm.*, 1889, 370, 575.

again come into the Chinese market, and it is stated to be absolutely pure. This deficiency is accounted for by the statement that young and imperfectly ripened material always yields such oil. On examination, Messrs. Schimmel found that the oil was not to be distinguished by its external appearance and characters from oil of the best quality. It did not contain rosin, fat, oil, petroleum, or any of the coarser adulterants. This oil has been rejected by the Hong Kong merchants, but some of it has found its way to India and places where low price is the chief attraction and there is but little appreciation of quality. The explanation given by the Chinese of its inferior character cannot be summarily rejected, since it is possible that young leaves may contain a considerable proportion of the acetic ester of cinnamyl (C_9H_9OAc), and that cinnamic aldehyde may be formed from that by oxidation during the growth of the plant. But it is more probable that this inferior oil is derived from other parts of the plant, or from another species of the genus of *Cinnamomum*. Messrs. Schimmel remark that the previous history of this subject furnishes no inducement to believe the statements made by the Chinese, and they reserve their opinion until they shall have examined the raw material from which the inferior oil is obtained. Meanwhile, they recommend that the determination of cinnamic aldehyde should be made the test of quality in purchasing the oil, and they state that the oil imported since last October has been found to contain at least 85 per cent. and sometimes as much as 94 per cent. of cinnamic aldehyde.

Bergamot Oil.—For many years the examination of this oil has been limited to the determination of its physical characters, and it is only within the past year that the acetic ester of linalool has been recognized as its most important constituent. This fact pointed to a means of determining the quality of the oil, as the ester is the odorous constituent. By a saponification method, described under the head of "Lavender Oil," the normal amount of ester has been found to be about 40 per cent., and the test may be relied upon for ascertaining the quality of bergamot oil. The chief adulterants are turpentine, orange and lemon oils. All three reduce the solubility of bergamot oil in dilute alcohol, as well as the specific gravity, and, of course, the amount of ester. The presence of orange oil is also indicated by its high optical rotation. In the examination of bergamot oil, it is necessary in the first place to determine the specific

gravity and the rotatory power. The alcohol test requires to be made more stringent—the oil should dissolve at 20° C., in from 1·5 to 2 volumes of 80 per cent. alcohol. Slight turbidity, increasing on addition of more alcohol, is due to separation of bergaptene; but no drops of oil should remain undissolved. Distillation of the oil under normal atmospheric conditions causes considerable decomposition, and this treatment is quite useless for the purpose of valuation. The results of a long series of experiments have proved that oil containing a high amount of ester is distinguishable from those kinds containing smaller amounts by the higher specific gravity and greater solubility in alcohol of 80 per cent. Oil of undoubted purity, pressed by Messrs. Schimmel, was found to contain more ester than any other kind, and it is probable that a perfectly pure oil is not to be met with in commerce. Experiments with mixtures of bergamot oil and turpentine, orange or lemon oils, have shown that the ester determinations may be fully relied upon, and as a minimum amount there should be 38 per cent. The specific gravity should not be under 0·881 at 15° C., and the optical rotation not more than 20° with a column of 100 mm. Practical experience has long proved that distillation of the oil is injurious, and that the much less convenient process of pressing must be preferred on that account. Experiments have shown that distilled oil contains much linalool, as a consequence of the decomposition of the ester, and by acetylating a distilled oil containing only 12 per cent. of ester the amount of ester was increased to 61·5 per cent. Even pressed bergamot oil contains some linalool, and a sample containing 37 per cent. ester was found after acetylation to contain 47 per cent. ester. It may probably be assumed that the oil obtained by distilling the residue of the pressing operation is used for adulterating the pressed oil, and that would account for the frequently small amount of ester, as well as the low specific gravity of the commercial oil as compared with absolutely pure pressed oil.

Lemon Oil—As the general result of further investigation, it has been found desirable to apply tests of increased stringency in judging of the purity of this oil. The determinations of optical rotation and specific gravity are of special importance; since the admixture of turpentine oil—almost the only adulterant—has the effect of reducing the rotatory power and increasing the specific gravity. By comparison of a number of samples with oil of known purity,

expressed by Messrs. Schimmel, it appears that pure lemon oil of good quality should have a specific gravity of 0·858 to 0·859 at 15° C., and an optical rotation not less than + 60°, with a column of 100 mm. But these data are by no means sufficient indications of quality, which can only be determined satisfactorily by ascertaining the amount of citral present. It has not yet been possible to do that; but Messrs. Schimmel are endeavoring to devise a method suitable for that purpose, and they have reason to believe that they will succeed. In reference to the recently established production of a concentrated lemon oil—wholly or partially deprived of terpene—a question is raised as to what may be expected to become of the by-products of that operation, consisting of a mixture of pinene and limonene, possessing some lemon odor but almost destitute of citral.

Sweet Orange Oil.—Similar observations of the characters of this oil have been instituted, and the conclusion arrived at is that it should have a specific gravity of 0·850 at 15° C., and a rotation of at least 95°. Addition of turpentine to the oil reduces the rotation and increases the specific gravity.

CLOVE CULTIVATION.¹

Undoubtedly the principal and most important cultivation of Zanzibar is that of the clove tree. It is grown wherever the soil is suitable, from the large and extensive plantations belonging to the Sultan and his family to the few trees owned by the more humble cultivator. The soil most suitable for clove cultivation is "a dark loam, having underneath a layer of dusky yellow earth, intermixed with gravel;" also "a yellowish or reddish stiff clay;" and these typical soils are all found on the island. Certainly the clove tree requires clay, and I observed there was always a marked difference in appearance between trees growing on a clay soil—red for preference—and those found on a lighter ground; and the finest trees were always either growing on a red clay, or else a stiff dark red to darker chocolate soil. The clove tree (*Caryophyllus aromaticus*), is a native of the Moluccas, and was introduced into Mauritius in 1770 by the French, and at the end of the century an Arab, by name Harameli-bin-Saleh, accompanied a French officer from Zanzibar to

¹ Consular Report; Phar. Jour. and Trans., April 1, 1893, p. 808.

Bourbon and obtained permission to take back a small quantity of seeds and plants with him. This was the commencement of clove cultivation in Zanzibar, Harameli making the first plantation at Mitoni, on the road to Chueni ; and the cultivation rapidly spread. The different methods by which this cultivation is now carried on are evidently borrowed from the French, and the Swahili word for clove, "garafu," is probably a corruption of the French word "giroflier."

Germination.—The seeds are first soaked in water for three days, and when germination has set in they are planted out 6 inches apart, with the bud end above ground, into shaded beds—the usual practice being to put down two seeds together in case of failure. If a large number of plants are to be grown the seeds are only put down 3 inches to 4 inches apart. Beds are about 6 feet wide, and of any length. They are shaded by a flat framework of sticks, over which is placed a layer of either dry grass or cocoanut leaves ; the height of this framework is about 3 feet to $3\frac{1}{2}$ feet. There is no regular rule for this, the important point being to keep the beds constantly damp. The slaves in charge go over to the nursery beds both morning and evening, watering any of which the surface has become dry, the practice being to sprinkle water with the hand from the water jar. The process may be summarized as follows : As long as the seedling is not thoroughly developed, every day ; when the plants are above ground, every other day ; when 6 inches high, once a week or ten days. The plants are kept, on an average, from nine months to one year in shaded beds. When the plants are about 6 inches high they are by degrees hardened by the thatch of the framework being gradually removed, and they are then left in the open beds freely exposed to sunshine for the space of one month or two months before planting out.

Planting Out.—Special care is taken in planting out. The earth round the plant is loosened by a peculiar triangular-shaped spade used especially on clove plantations, and called "moaa," and in use in Zanzibar, as well as the ordinary native "jembe," or hoe, already referred to. The plant is then carefully lifted out by the hand with as much earth adhering to the roots as possible, and placed upon two strips of banana fibre previously placed cross-wise upon the ground. (Each strip of fibre is about 3 inches to 4 inches wide, by $1\frac{1}{2}$ feet to 2 feet in length.) The four ends are then taken up and wrapped round the plant and firmly tied together. The plant is

then carried to its destination, the strips of fibre effectually keeping the earth in position. Before planting, the pieces of fibre passing beneath are cut at each corner, and the plant finally placed in the hole prepared for it and the earth heaped round; the four ends of the fibre left at the sides are then removed one by one, the bottom portion being cut through, enabling this to be done with ease.

After Treatment.—If the weather is hot, or in the event of drought, the young plant is watered in the evening daily, and watering is continued as required until the plant attains the height of 18 inches, or, roughly speaking, during the space of one year. The young plants are not shaded in any way after planting. There appears to be great mortality amongst young plants, and a good deal of supplying is required, and a nursery is deemed indispensable for five years after a plantation is first opened up. (Probably were the plants shaded until established, their level raised, and less frequently watered, and better hardened before planting out, this excessive mortality would be checked.) No ground or other cultivation is permitted amongst the cloves, but slaves everywhere appear free to cultivate their own plots and gardens amongst the trees, and I also observed cassava growing in a clearing of young clove trees; and the general run of small "shambas" consists of cloves, cocoanuts, mangoes and other fruit trees, all planted indiscriminately, and close together. No pruning whatever appears to be done. No manuring either, apart from fallen leaves, and this in the more favored localities where the rows of clove trees shade the ground must add greatly to the fertility of the soil, the accumulation of leaves being considerable, and the flat nature of the ground preventing wash.

Age of Trees.—There are some trees now growing on the island which are said to be nearly 90 years of age, but the average length of life of the clove tree in Zanzibar appears to be from 60 years to 70 years, and I have this on the authority of Mahomed-bin-Saif Drumiki, an elderly Arab of much experience, and who has been for over 20 years in charge of the Sultan's plantation at "Indo." Such terrible devastation resulted from the great hurricane of 1872, when nearly all the clove plantations on the island were destroyed, that the average age of the trees now growing may be put down as below 20 years, and the age of the trees in the Sultan's plantation, the largest in the island, is from 16 years to 17 years. The appear-

ance of the clove plantation is, as a rule, most healthy and luxuriant, the height of the more matured trees averaging fully 40 feet, and the branches of the two rows often completely shading the ground. Clove trees generally have forked stems, and often as many as three and four, and a single boled tree is the exception.

Enemies.—So far as I have been able to ascertain, and I have made careful inquiries on this subject, the clove tree is not subject to any fungoid disease, and the percentage of dead, dying and unhealthy trees noticed by me was very small. The cause generally was either a damp situation, or else want of cultivation, and the presence of grasses, especially "hook," called in Swahili "Pamba ya moi." The clove tree, however, suffers from the attacks of two enemies: One a caterpillar, which attacks the foliage in the dry weather and often denudes the tree of its leaves, but the tree recovers at once as soon as the rain sets in. The other is the white ant, which occasionally attacks the roots. No remedial measures appear to be taken.

Collection.—Clove trees begin to yield, in good situations, 5 years from planting; in inferior soil, 6 years to $6\frac{1}{2}$ years from planting. Cocoanut trees are generally planted at irregular distances between the rows of clove trees, but the reason for doing so appears to be quite forgotten, the usual reply being that "it was the custom." (Cocoanut trees are usually planted here and there amongst the clove trees in Amboyna and the Moluccas, it being believed that the proximity of this tree is beneficial to the clove. The French most probably adopted the custom in Mauritius and Réunion, and it eventually found its way to Zanzibar.) The picking of the buds commences in August and lasts for four months, and on an average each tree is picked three times in a season. The unexpanded buds on the trees are at first a pinkish yellow, becoming a deeper red as they mature. The stalks and buds are gathered at the same time, and thrown on to grass mats spread on the ground; the picking of the higher branches is done by means of triangular bamboo ladders. Other slaves pick off the buds from the stalks, and they are then spread out to dry in the sun, being taken in every night.

Drying.—The cloves are dried on mats in direct sunlight. The drying is continued for the space of 6 days or one week. Green cloves dry down to about half their weight; thus 1 frasila,¹ green,

¹ 1 frasila = 35 lbs.

is equal to $\frac{1}{2}$ frasila, dry. The color desired in the dry clove is red; and buds of this color are more valued than black. Cloves are dispatched to Zanzibar in gunny bags. There is a duty due to Government of 25 per cent.; this is paid in kind, and the cloves heaped in bulk in the Government godowns. Public auctions of this are now held by Government every fortnight to allow open competition, and especially to admit European merchants. Zanzibar cloves are very dry, differing much in this respect from the Pemba produce, and can be stored for some time, but Pembas are disposed of as early as possible, as otherwise the loss from "shortage" is very great. The latter generally arrive damp, and there is much shortage when dried. A good dry sample of Pemba cloves is smaller and blacker—blacker from having contained much moisture. Zanzibar cloves are larger, the red appearance of the dried buds is unmistakable, and they are well-known as "Zanzibar red-heads."

Export.—Cloves are generally exported in double mat bags ("makanda") in preference to gunnies, though there is more shortage—in fact, the difference is marked; though double, the mat bags apparently permit a greater absorption of damp. The difference of shortage between Zanzibar and Europe in the weight of the cloves equals 8 per cent. The difference between Zanzibar and Pemba cloves is well recognized in Europe, but large shipments of both varieties are also made to Bombay, where they are very probably mixed. Also large exports of clove stalks are made to both Bombay and New York. The exports of cloves from Zanzibar for 1890-91 are as below:

	1890.	1891.
	Frasilas.	Frasilas.
Zanzibar,	124,929	62,017
Pemba,	385,981	326,986

GENERAL METHOD OF CHEMICAL SYNTHESIS.¹

BY R. PICTET.

According to the theory which the author holds, all chemical action should be impossible at very low temperatures, and a series of very interesting experiments has been executed in order to show that this is the case. Aqueous sulphuric acid, containing 89

¹ Compt. rend., 115, 708-712, and 814-817; Jour. Chem. Soc., Abstr., 1893, ii, 112.

per cent. H_2SO_4 and solidifying at -56° , was brought when in the solid condition and at -125° into intimate contact with finely powdered sodium hydroxide, also at -125° , and the two strongly compressed without any sign of chemical change occurring. The passage of electric sparks through the mass only causes action to take place in the path of the sparks, but this action is not communicated to the rest of the mixture. On warming, action suddenly commences at -80° , the heat evolved and abrupt change of temperature causing breakage of the vessel containing the mixture. With sulphuric acid containing 35 per cent. H_2SO_4 and solidifying at -88° , similar results were obtained. Potassium hydroxide employed in place of sodium hydroxide remains in like manner unacted on below -90° . Concentrated ammonia and sulphuric acid do not act at all on one another below -80° ; above this temperature, a limited action takes place under the action of electric sparks, and at -60° to -65° complete action suddenly occurs. Sulphuric acid and common salt do not react below -50° ; from -50° to -25° there is a limited action, and then complete action occurs. With the carbonates of calcium and sodium and 35 per cent. H_2SO_4 , there is no action at -80° . The first bubbles of gas make their appearance at -56° with sodium carbonate, and at -52° with calcium carbonate, and the reaction becomes turbulent at -15° with calcium, and at -30° with sodium carbonate. All other carbonates behave similarly. With nitric acid in place of sulphuric acid, similar results were obtained in all the above cases, chemical action commencing, however, at a slightly lower temperature in each case: Metallic sodium, when brought into contact with aqueous alcohol, containing 84 per cent. alcohol, at -78° , undergoes no change. Action only commences at -48° , and then proceeds briskly. Sodium and 35 per cent. H_2SO_4 may be mixed at -85° without any action occurring, but, when heated up to -50° , a violent action suddenly commences, the hydrogen evolved inflaming spontaneously. Metallic potassium acts in a similar manner, but in this case change sets in at -68° instead of -50° . If sulphuric acid and an alcoholic solution of barium chloride are mixed at -85° , no change occurs, a precipitate first appearing when the solution is heated to -70° . At -40° the reaction is complete. Alcoholic silver nitrate and hydrochloric acid were mixed at -125° without reaction. At -90° action commenced, and was

complete at — 80°. Potassium hydroxide in alcoholic solution and phenolphthalein were mixed at — 135° without any change occurring; a faint red tinge appeared at — 100°, and the color was pronounced at — 80°. Litmus in contact with sulphuric and hydrochloric acids remains blue at — 120°, a sudden change to red taking place in the one case at — 105°, and in the other at — 110°.

As general results of these observations, the author concludes that no action whatever takes place between the temperatures — 125° and — 155°, no matter what the nature of the reacting substances.

MINUTES OF THE PHARMACEUTICAL MEETING.

MAY 16, 1893.

On motion, Mr. Wm. McIntyre was called to the chair. The minutes of the last meeting were read, and no corrections being called for, they were approved.

The following report was read:

The committee on Pharmaceutical Meetings would respectfully submit the following report:

The meetings have been held each month from October, 1892, to May, 1893, inclusive, and the increased attendance and interest manifested have been marked. A feature introduced during this series has been an occasional short address upon subjects interesting to pharmacists; the most notable being those of Prof. Remington on acetic acid as a menstruum; Prof. Sadtler on sodium peroxide; and Dr. J. D. McFerran on compressed tablets. One of the most interesting was the address of Mr. Jos. R. Wilson when exhibiting the "Shaw Gas Tester and Inspector machine." While not applicable to pharmacy this application of the principles of chemical phenomena and the mechanical ingenuity of the machine and its accurate working proved a subject of great interest to the audience.

Manufacturers are recognizing the value of the meetings as a means of introducing to the members of the drug trade new products, apparatus and machinery, and no doubt this will prove a valuable feature of our meetings in the future.

Under the title of verbal communications numerous observations, formulas, suggestions, queries and prescription difficulties have been reported. While in the published report of the proceedings these make but little showing, their practical importance to the pharmacist is incalculable and they have done much to increase the popularity of these meetings.

Twelve papers read before these meetings have been published in the American Journal of Pharmacy, and in addition they have elicited several editorial comments and articles.

While the number of papers read has not been as large as in several years past, this is but in sympathy with the present prevailing ebb in the tide of pharmaceutical literature to which attention has already been directed by

the editor. And it is a source of congratulation that in spite of this and the interruption arising from the building operations of the College, original papers have been presented at nearly every meeting. Our Pharmaceutical Meetings continue to be an index of the advance in pharmacy.

It is a matter of regret to the committee that the circle of contributors is not more extended, and they would take this opportunity of again impressing upon each graduate of our College that our *Alma Mater* expects and invites them to participate in her institutions. The pharmaceutical meetings and the American Journal of Pharmacy are two of her oldest and most valuable institutions.

Contribute here your observations, experiments and difficulties. Write to any member of the committee.

GEORGE M. BERNINGER,
J. W. ENGLAND,
HENRY TRIMBLE,
CLEMENT B. LOWE,
WILLIAM MCINTYRE.

The report was accepted, and F. X. Moerk moved a vote of thanks to the committee for the efficient manner in which they have discharged their duties. This was unanimously passed and the committee discharged.

A paper upon a *proximate principle of phytolacca* was read by Prof. Trimble. Prof. Maisch thought that this principle was apparently purer than others which had been previously isolated as the active principle of poke root; but that physiological experiments were needed to ascertain its claim to that distinction. Modern researches, largely carried on under the supervision of Professor Kober, had shown that many of the saponin-like compounds, as formerly prepared, could be separated into two or three distinct principles, differing in their poisonous properties and in their power of destroying the red blood corpuscles.

A paper upon the *comparative value of different brands of hydrogen peroxide*, by Richard L. Lloyd, was read by Mr. Moerk. Referring to the term *fresh* used in the paper, Professor Maisch thought that it was applied in a commercial sense, meaning recently procured in the market; also that a solution of hydrogen peroxide was so prone to decomposition according to its concentration, and under the influence of temperature, contact with certain bodies and other conditions that many manufacturers declined preparing it on a large scale of a guaranteed strength. Dr. Squibb preferred to furnish the carefully adjusted materials for preparing the solution as needed, giving minute directions to insure success. Mr. Moerk stated that a neutral solution is less permanent than one slightly acid; but that it is certainly a mistake for manufacturers to state on their labels that it is entirely permanent.

Dr. C. B. Lowe exhibited specimens of *Sepia officinalis*, the male and female cuttlefish, procured from the eastern Mediterranean, and gave some account of the habits and uses of this cephalopod.

Professor Maisch called attention to the fact that the so-called feet of cephalopods were tentacles used by the animals for various purposes, and that their construction was peculiar. The size attained by different species of cephalopods was also alluded to.

Dr. Lowe also called attention to *Webb's ice shaver and crusher* as being a very successful and convenient device offered in the market for this purpose.

A very simple and effective device for fastening the corks of bottles containing effervescent drink and liquids consists of a small tin disc slightly concave, pierced with two holes through which flexible-tinned wires are passed. The convex side is placed against the neck of the bottle and the wires passed to the other side of the neck, where they are twisted; after the cork is driven into its place, the wire is passed over the cork and a turn around the disc is taken and the ends twisted together forming a firm "tie" over the cork. Their moderate price, and the fact that they are generally left attached in good condition to the bottle returned for repetition, makes them a very desirable method of securing corks.

W. L. Cliffe, Ph.G., exhibited samples of rubber-coated corks, having the advantage of the rubber cork, but being very much cheaper; they have been used for iodine, acids and alkaline liquids quite successfully.

Prof. Maisch exhibited a plant, *Scopula carniolica*, a native of Austria, which he had raised from a living rhizome, received from Parke, Davis & Co. through Mr. Naglevoort, of Detroit. The rhizome had survived the last severe winter in the open air, and produced its first flowers in the first half of April; he also called attention to its botanical characters and its chemical constituents as determined during recent years.

A flowering branch of *Magnolia grandiflora*, sent him from Florida, was exhibited by Prof. Maisch, who explained why this handsome tree, according to strict rules, recently adopted by botanists, is now sometimes called *M. fætida*, a name it by no means deserves, as there is nothing like fetor in its odor.

Professor Maisch made inquiry whether any one present had recently examined jalap root for the yield of resin; the pharmacopeia of 1880 required it to contain 12 per cent., but it had often contained much less resin. Recently, however, a much better quality of jalap had been met with, and specimens received from New York and Detroit had assayed from 16 to over 20 per cent. of resin. It seemed strange that no attempt had yet been made to cultivate the plant in this country, while it was a matter of record that the roots would survive our winters and those of central Europe. He hoped to get roots from Mexico for the purpose of experimentation.

Prof. Maisch called attention to two samples of water, received from the Buffalo Pure Water Co.; from the label it was learned that the water recommended for drinking purposes was a water twice distilled with much care, and subsequently aerated; this was stated to be used to prepare the *lithia water* that constituted the other sample and appears to be a solution of lithium carbonate in such water. The same water is also used in the preparation of other artificial mineral waters, for which pure water alone should be employed.

A prescription calling for emulsion of *terralin* was read, and it was stated that *terralin* is a proprietary article of the nature of soft paraffin, and put upon the market from Washington, D. C. One part of acacia to 2 parts of this substance having yielded a pasty emulsion, it was suggested that a small quantity of tincture of soap bark would be useful in emulsifying, or probably a little gelatin would aid in keeping the substance in suspension.

Thyroid, made by Parke, Davis & Co., was exhibited; it is claimed to be of equal efficacy with the fresh thyroid gland of the sheep, and is recommended in myxedema.

Two specimens of dilute *hydrocyanic acid* were exhibited, one of which had been repeatedly opened and remained unchanged in appearance, while the other, prepared at the same time, and kept in a glass stoppered bottle wrapped in dark colored paper, had become quite black; a change attributed to the formation of paracyanogen.

At a recent meeting Mr. Ross had exhibited some crystals which he found in a specimen of *extract of stramonium*; examination showed them to be *chloride of potassium*.

Professor Trimble exhibited a plant, *Impatiens Balsamina*, which had been germinated in washed saw-dust, and it was then transferred to a bottle containing *nutritive solution*, and was now in full bloom. Several plant foods, recommended in botanical works, were tried and proved less satisfactory than the one made by the following formula:

Potassium nitrate,	0'500	gram.
Calcium nitrate,	0'500	"
Sodium phosphate, crystals,	0'250	"
Potassium chloride,	0'250	"
Magnesium sulphate, crystals,	0'250	"
Ferrous sulphate, crystals,	0'005	"
Distilled water,	1,000	cc.

The salts are separately dissolved each in 166 cc. of water, and the sodium phosphate solution is added last to the mixture.

Glycerite of zinc having been prescribed, the physician who ordered it gave the formula as follows: Pure oxide of zinc, 3 ss; glycerin, 3 iij.

The Chairman announced the committee for the next series of meetings to be Prof. H. Trimble, Chairman; Dr. C. B. Lowe, J. W. England, Wallace Procter and W. L. Cliffe.

On motion, adjourned.

T. S. WIEGAND, *Registrar.*

REVIEWS AND BIBLIOGRAPHICAL NOTICES.

Manual of Chemistry.—A guide to lectures and laboratory work for beginners in chemistry. A text-book specially adapted for students of medicine and pharmacy. By W. Simon, Ph.D., M.D., Professor of Chemistry and Toxicology in the College of Physicians and Surgeons, Professor of Chemistry and Analytical Chemistry in the Maryland College of Pharmacy, Baltimore. Fourth edition, thoroughly revised. Philadelphia: Lea Bros. & Co. 1893. 8vo. Pp. 493. Price, cloth, \$3.25.

This valuable work, upon which we have commented when it first made its appearance in 1884, and since then, is now before us in its fourth edition, and remains unchanged in its eminently practical scope and in its judicious arrangement, but has been somewhat modified in certain details, and carefully revised so as to make it, if possible, even more adapted to the wants of the medical and pharmaceutical student than heretofore. Considering the rapid advances made in chemistry as applied to medicine and pharmacy, the addition of new matter was absolutely necessary; and this has been done in such a way as not to change the character of the work, which is that of a guide to beginners in

chemistry, with special reference to students of pharmacy and medicine. We are glad to observe that a special feature of this manual, to which we called attention nine years ago, has met with general favor, and has been retained in the edition before us. We refer to the plates showing 56 representations of the exact colors or change of colors of characteristic reactions, which are appreciated not only by the tyro. Mainly because in the new United States Pharmacopoeia the system of orthography and nomenclature of chemical compounds recently proposed (see April number, p. 179), has not been adopted, the author also adheres to the system thus far in use, it being considered unwise to have the student confronted by two different systems of orthography. There is much force in this argument, as we know from personal experience; for though we have advocated some of these changes years ago, we have been using them in print only to a very limited extent, for reasons similar to the one stated. Yet an effort should be made for the general adoption of the rules by journals and text-books; uncertainties, which might be arising from the perfectly proper conservative course pursued by the Pharmacopoeia and similar works, would then easily be set aright.

Missouri Botanical Garden.—Fourth annual Report. St. Louis, Mo.: published by the Board of Trustees. 1893. 8vo. Pp. 226 and 23 plates.

The handsome volume contains various reports, addresses, etc., relating to Shaw's garden, and two valuable scientific papers, one of which on *Yucca*, by Professor Trelease, was noticed on p. 206 of our April number. The other paper is a list of plants collected in the Bahamas, Jamaica and Grand Cayman, by Professor A. L. Hitchcock. Seven of the Bahama Islands were visited, and four parts of Jamaica. The total number of species determined is 953, to which are to be added the varieties and the cultivated species. The list gives the localities of collection, and is accompanied by remarks on nomenclature and on the relation of the flora of the Bahamas; also by a tabular exhibition of the plants collected, showing their distribution in the islands visited, and in other localities of the western hemisphere. A full index of genera, including the synonyms renders the list very available for reference.

J.-L. Soubeiran, décédé le 15 décembre, 1892. Montpellier. 8vo. Pp. 20.

The pamphlet contains the discourses pronounced in the école de pharmacie on the occasion of the funeral services; also a list of the publications by the deceased savant, the titles of the essays and books occupying nine pages in print.

Promenades et Excursions botaniques faites en 1891 dans les environs de Besançon, le Doubs et les Vosges. Compte-rendu par Ménélik. Besançon. 1893. Pp. 35.

These botanical excursions, undertaken under the guidance of Professor Dr. A. Magnin, of the Besançon School of Medicine and Pharmacy, are quite entertainingly and humorously described by the author; as far as the plants collected are concerned, the names of the more interesting or rarer species only are given.

Experiments with Sugar Beets in 1892. By Harvey W. Wiley, chemist of the U. S. Department of Agriculture and Director of the Department Sugar Experiment Stations, at Schuyler, Nebr., Runnymede, Fla., and Sterling and Medicine Lodge, Kan. Washington. 1893. Pp. 74.

Record of Experiments with Sorghum in 1892. By Harvey W. Wiley. Pp. 100.

These two pamphlets are Bulletins 36 and 37 of the U. S. Department of Agriculture, Division of Chemistry, and have been prepared, the former with the collaboration of Dr. W. Maxwell, and the latter with the assistance of Messrs. A. A. Benton, G. O'Brien, W. J. Thompson, J. L. Fuelling and O. Carr.

The addresses at the inauguration of Chas. Kendall Adams, LL.D., to the presidency of the University of Wisconsin, January 17, 1893. Madison. Pp. 69.

That on an occasion, as indicated on the title page, the addresses should be on the subject of education and educational institutions in their various relations, is self-evident ; they will be read with much interest.

Psychopathia Sexualis, with Especial Reference to Contrary Sexual Instinct. A Medico-Legal Study. By Dr. R. von Krafft-Ebing, Professor of Psychiatry and Neurology, University of Vienna. Authorized translation of the seventh enlarged and revised German edition. By Charles Gilbert Chaddock, M.D., Professor of Nervous Mental Diseases, Marion-Sims College of Medicine, St. Louis, etc. Philadelphia. The F. A. Davis Company, Publishers. 1893. 8vo. Pp. 436. Price, cloth, \$3 ; sheep, \$4.

The author states in the preface that the purpose of his treatise is a description of the pathological manifestations of the sexual life and an attempt to refer them to their underlying conditions. The task is a difficult one, and, in spite of years of experience as an alienist and medical jurist, the author is well aware that what he can offer must be incomplete. Yet, the importance of the subject for the welfare of society, especially forensically, demands that it should be examined scientifically. This the author has faithfully done. His work is divided into four parts, treating respectively of psychology of the sexual life, physiology, general pathology and special pathology, each part being comprehensive, and in its details as well as in its generalizations, showing the earnest search after the fundamental facts, so as to gain an insight into cause and effect. A noted physician has said that the terminal forms of sexual aberrations end in asylums for the insane, but the doubtful cases in which completeness of development or apparent viciousness render correct diagnosis difficult, make up the majority. This it seems to us states the necessity for such a work in a few words ; it is intended for the physician as well as for the jurist. The translation has been well done, and the intentions of the author are clearly presented in the English version. The book is sold only by subscription.

Contribution à l'étude des lactoses. Par Georges Denigés, docteur es sciences physiques, etc. Bordeaux. Pp. 69.

This contribution to the study of the lactoses is a thesis presented to the Paris School of Pharmacy for obtaining the diploma of pharmacist of the first class. The author has studied the sugar contained in six different milks, that of woman, cow, goat, ewe, ass and mare, and has shown the chemical identity of these sugars. The milk sugar contained in the extract obtained by evaporation at 100° C. was found to be anhydrous. The properties of the sugar and of the serum have been investigated and compared ; and in the latter two different substances were found, which are freely soluble in water, not precipitated by

reagents for albuminoids, and destitute of reducing power ; one having a dextrogyre rotation was met with in mare's and ass' milk ; the other, laevogyre, in woman's milk. These new compounds are being further investigated.

Pharmaceutical Society of Australasia, with which is incorporated the Pharmaceutical Society of Victoria, Melbourne.

The 36th annual report gives a brief account of the transactions of the Council and of the Society, with lists of members, honorary members, etc.

Annual Address before the State Board of Health of Pennsylvania, by S. G. Dixon, M.D., Professor of Hygiene in the University of Pennsylvania. Pp. 15.

The address treats of tuberculosis and its prevention.

A monograph on Cascara Sagrada. A condensed compilation of the most recent and valuable literature on this important drug. Detroit : F. Stearns & Co. Pp. 17.

This little pamphlet treats briefly of the botanical and chemical history of the drug named, and gives more in detail, a considerable number of abstracts referring to the medical action and therapeutic uses of this valuable bark. A copy of the pamphlet will be mailed to those interested upon application to the publisher.

OBITUARY.

Daniel Sexton Jones, Ph.G., class 1843, died at his residence May 12. He was born near Columbus, O., November 13, 1822, was educated at a boarding school, at Burlington, N. J., and served his apprenticeship in pharmacy with Henry Zollickoffer, Sixth and Pine Streets, Philadelphia. His graduating thesis on *Arum triphyllum*, was published in this journal in 1843. In 1846 he began business for himself at 1201 Spruce Street, where he continued until his death. He became a member of the Philadelphia College of Pharmacy in 1845, and took an active part in its welfare, participating in former years in the pharmaceutical meetings, and serving the College frequently on committees and for many years as a member of the Board of Trustees. His widow and a daughter survive him.

Albert F. Stifel, Ph.G., class 1873, died in his native city, Wheeling, W. Va., April 10, after a lingering illness, caused by a tumor on the optic nerve. He was born July 22, 1855, learned the drug business in Wheeling and in Philadelphia, and after graduating in this city, clerked in New York, until he went to Germany to study medicine at Würzburg and Leipzig, graduating from the latter university in 1879, and subsequently spending six months in the hospitals at Vienna. At Wheeling, where he settled after his return, he soon secured a lucrative practice, and was selected to fill a number of responsible and honorable positions. He leaves a widow and 3 children.

Edmund Francis Bocking, a member of the last senior class, died in this city, April 2, of inflammation of the brain ; the body was taken to his former home at Wheeling.

Frederick Henry Pashley also a senior student, died at his home, Bridgeport, N. J., March 24, of consumption.